# Grinding and Finishing

WHEELS • GRINDING • HONING • LAPPING MACHINES • ACCESSORIES • PORTABLE GRINDERS • TUMBLING • ABRASIVES

The Magazine Devoted Exclusively to Abrasive Operations

AUG 14 1955

## CHICAGO

## *Machine Tool Show Issue*

**Equipment to be Shown**

**List of Exhibitors**

**Chicago Motel Guide**

ALSO IN THIS ISSUE

Tool and Cutter Grinding Department

Safety

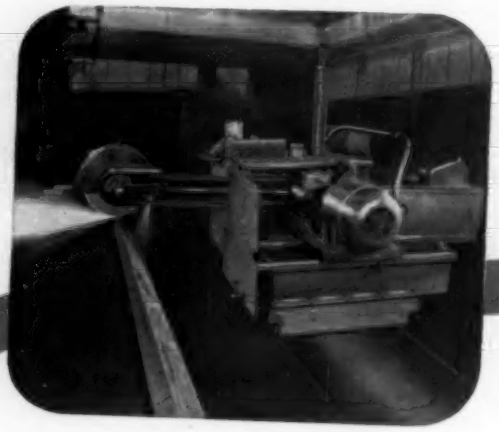
Free Literature

New Equipment

hitchcock publications

**August 1955**

*No matter what grinding method you use...*



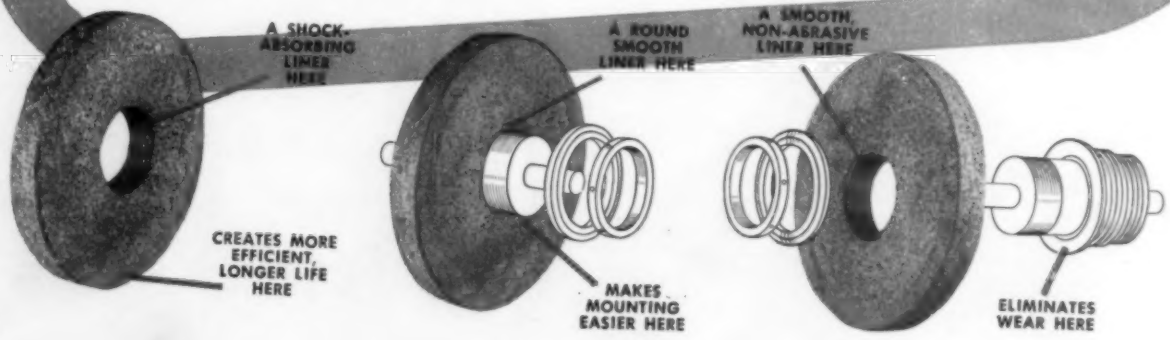
# MID-WEST SNAGGING WHEELS ARE MORE EFFICIENT!

Here are the two big reasons for Mid-West's low-cost efficiency. They're ready to go to work for you!

1. Mid-West designed fiber-cushioned arbors minimize vibration. They're baked-in shock absorbers bonded in for life!

2. Mid-West snagging wheels' extra-tough bonds are designed especially for billet snagging, grinding of steel and alloy castings, and snagging operations on all types of non-ferrous metals and cast irons.

Here is real grinding efficiency that's bound to help you cut high production costs. For complete information—write, wire or phone today.


A SHOCK-ABSORBING LINER HERE
A ROUND SMOOTH LINER HERE
A SMOOTH, NON-ABRASIVE LINER HERE
CREATES MORE EFFICIENT, LONGER LIFE HERE
MAKES MOUNTING EASIER HERE
ELIMINATES WEAR HERE

# MID-WEST ABRASIVES

Executive Offices:
510 South Washington St., Owosso, Mich.
Factories: Owosso, Mich. • Rochester, Penna.

Encircle No. 273 on card, opposite Page 72

AUG 31 1955

AUGUST, 1955 — VOL. 1, NO. 4

# Grinding and Finishing

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### EDITORIAL STAFF

*William F. Schleicher*, editor; *Ronnie Burritt*, consulting technical editor; *Victor G. Morris*, associate editor; *Richard C. Bush*, assistant editor; *D. E. Aimone*, readers' service.

### BUSINESS STAFF

*R. C. Van Kampen*, president; *Vincent C. Hogren*, executive vice president; *J. E. Hitchcock*, vice president; *Oliver S. Pepper*, business manager; *John S. Todd*, production manager; *L. M. Schroeder*, art director; *Robert L. Spreckels*, circulation manager.

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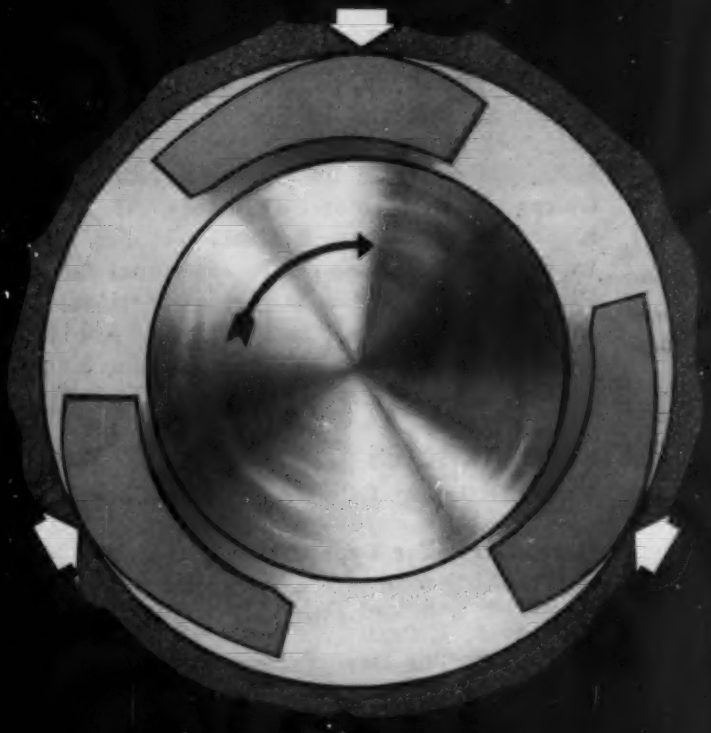
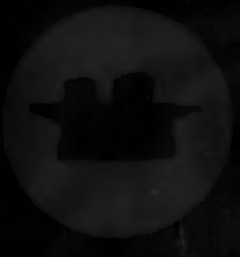
# Unequaled Attendance Record

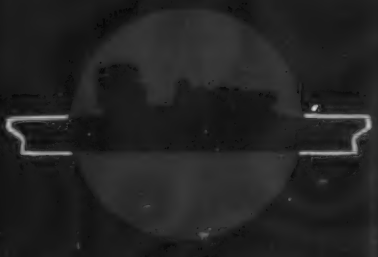


CINCINNATI FILMATIC grinding machines are symbolized here.



PLAIN GRINDING MACHINES

UNIVERSAL GRINDING MACHINES



ROLL GRINDING MACHINES

CINCINNATI

## OVER 17 YEARS, WITHOUT MISSING ONE SINGLE MINUTE OF THE WORKING DAY!

That's the amazing record of CINCINNATI FILMATIC grinding wheel spindle bearings, a standard feature of Cincinnati centertype and centerless grinding machines. Some of these machines, built 17 or more years ago, are still running, and the grinding wheel spindle bearings have never once required adjustment or maintenance; have never once slowed down or stopped production.

Over 99% of FILMATIC spindle bearings—thousands of them—have compiled this highly desirable cost-reducing record for Cincinnati grinding machines in metalworking shops everywhere.

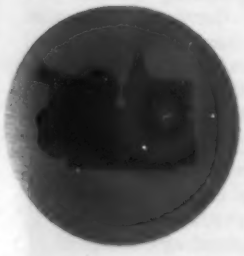
You can obtain the advantages of FILMATIC spindle bearings by installing Cincinnati precision grinding machines in your shop. Would you like to know more about these bearings? Write for the booklet illustrated here. And if you're not familiar with current Cincinnati grinding machines, write for general catalog No. M-1776-2, or look in Sweet's Machine Tool Catalog.

Space does not permit going into detail about CINCINNATI FILMATIC spindle bearings. The full story, and how they can benefit your shop, is contained in this profusely illustrated booklet. Write for your copy. Ask for publication No. G-604.

**CINCINNATI GRINDERS INCORPORATED**
**CINCINNATI 9, OHIO**

# CINCINNATI

**CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES**
**CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES**


CENTERLESS GRINDING MACHINES

CHUCKING GRINDING MACHINES

MICRO-CENTRIC GRINDING MACHINES

CENTERLESS LAPPING MACHINES

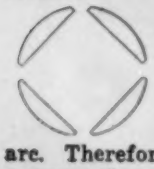
Encircle No. 202 on card, opposite Page 72

# You can really improve grinding action with CORTLAND "True Segments" and segmental chucks

Cortland Abrasive Segments manufactured by Cortland Grinding Wheels Corporation and Cortland Segmental Chucks have been really "proved in performance" time after time after time. Together they produce higher rates of stock removal with less segment wear and better finishes.

There are two positive reasons for Cortland's remarkable performance record.

**1.** *The Unique Shape of each Segment.* The "True Segment"® shape was originated by Cortland for surface grinding. It provides a grinding action that promotes an unequalled high rate of stock removal and improved grinding finishes.



As the illustration shows, the inner edge of the grinding face of each Cortland Segment is a straight line, while the outer edge is a true arc. Therefore, the grinding area is narrow at each end and wide in the center. Thereby two important principles of surface grinding are employed to guarantee the superior grinding of Cortland Segments. In addition to the grinding action which normally occurs because of the down-feed of the machine, the Cortland "True Segment" shape acts to remove stock with a continuously varying area of contact between work and segment.

This variable area of contact results in uniform grinding on the entire surface with a lower *average* pressure on the work and with less distortion; combines with the action of the coolant to reduce heat generation.

*The result:* higher rates of stock removal with better finishes to closer tolerances.

**2.** *The Cortland Standardized, Simplified Chuck Design* incorporates a number of special features which promote safety, speed resetting or changing of segments while at the same time saving power and reducing maintenance. *They can be universally adapted to vertical spindle surface grinders.*

Cortland Chucks are outstanding because of their simple, rugged design, careful workmanship and accurate balance. They are tough, yet light in weight, uniform in size. There are no complicated mechanisms to become fouled up with grinding sludge or to require special adjustment. And as an added convenience each set of segments is packed carefully in individual cartons, with both segments and cartons marked clearly for full identification.

Let us "prove in performance" the *really* improved grinding action you can realize with Cortland Abrasive Segments and Segmental Chucks.

Contact your nearest Cortland Representative for a convincing demonstration — or direct to the factory.

*We are prepared to serve you with a complete line of abrasive wheels of all types, engineered to give you the highest efficiency in your grinding operations.*

**CORTLAND GRINDING WHEELS CORPORATION**
**Chester, Massachusetts**

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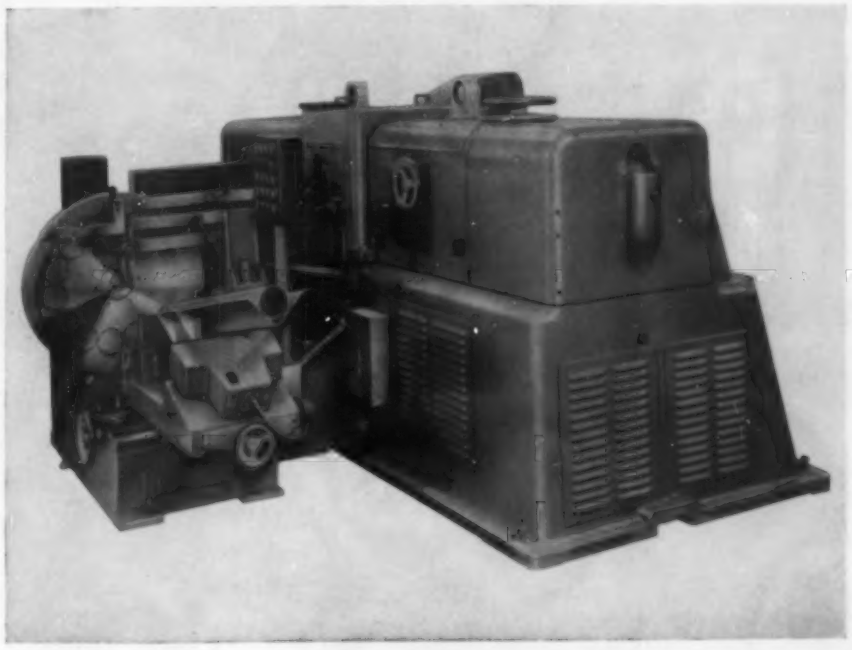
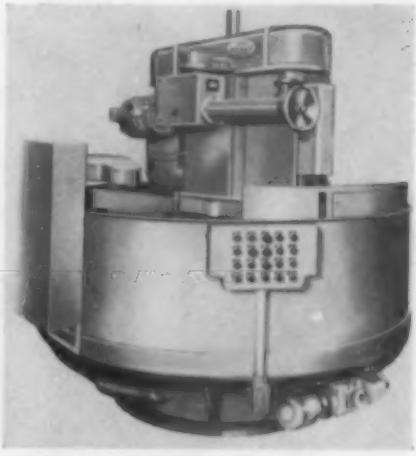
# BESLY Grinderscope

NEWS AND VIEWS ABOUT WAYS TO CUT COSTS WITH MACHINES AND METHODS
FROM BESLY-WELLES CORPORATION, BELOIT, WISCONSIN





**SIMPLIFIED FACE GRINDER**
No. 711 Besly-Bowen Radial Head Face Grinder with all movements mechanically interlocked for easy push-button control. Permits continuous production with automatically controlled grinding cycle at alternate rotary work tables.

## See 'Em at the Show

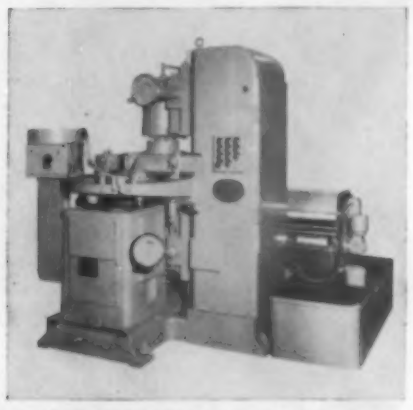
**New Besly High Production Grinders To Be Displayed at Machine Tool Show . . . Booth 911**

Besly's Model No. 240 Double Horizontal Spindle Grinder (above) is expected to be of special interest to showgoers. This grinder is an all-new machine that has been brought out to meet the growing demand for greater precision at higher production rates.

The 240 has an improved design of Besly's exclusive Sealed Spindle Quill which seals out grit, allows smoother and more accurate adjustment of discs. The Quill rides on Formica ways. With an electro-magnetic feeder unit, work is fed between the discs in a continuous stream. Down-time to change from one part size to another is sharply reduced by this feed arrangement.

The grinder is entirely automatically controlled. Even dressing each of the two discs with separate dressers is controlled with a push-button. Individual mounting of dresser arms assures squareness with the heads regardless of alignment. All controls, motors, starters and hydraulic units are enclosed within the rugged machine base.

Besly engineers claim that design of the machine has cut down-time for dressing, disc changing and set-up to one-third that required with other grinders. Full details about the Model 240 are available from the factory. Write Besly-Welles Corporation, Beloit, Wisconsin.



**DESIGNED FOR AUTOMATION**
No. 910 Double Vertical Spindle Grinder can be fixtured for hopper feeding and automatic discharge. Grinds two surfaces parallel in one pass.

**USEFUL GRINDER FOR ANY SHOP**
No. 318 Tub Grinder with an 18-in. abrasive disc can be used for snagging castings or generating flat surfaces prior to locating on magnetic chuck. Available for free-hand use or with fixtures for production grinding.

**More Besly Grinder Information — Next 3 Pages**

# Grinderscope

**News and Views About Ways to Cut Costs with Machines and Methods from Besly-Welles Corporation, Beloit, Wisconsin.**

# Besly Grinders Triple Mower Blade Production

## and Abrasive Life for International Harvester

Mower blades are a high volume item at International Harvester's McCormick Works in Chicago. In some years as many as 16 million have been produced by the plant.

In the past, a number of hand loaded grinders were used to put a sharp, beveled edge on the blades. Production averaged 5000 blades per two machine unit per day.

In 1939, a Besly Model No. 953 Vertical Spindle Grinder was installed for this beveling operation. Production shot up to over 15,000 blades per day. Using a 36-in. Besly-Titan disc three inches thick, with a eight and one half inch center hole, the machine was consistently grinding over 450,000 pieces before disc replacement was necessary. The old type machines averaged only 130,000 units of a smaller blade before their 20″x8″x10″ discs had to be replaced. Even though more metal was being removed, the combination of modern Besly grinding methods, Besly-Titan abrasives and the installation of a newly developed coolant flotation filtering system gave three times the abrasive life. McCormick Works estimates that each Besly-Titan disc removes a total of 9,000 pounds of hardened steel (Rockwell 55). The disc is in two sections with nut inserts used to attach it to the grinder.

As a result of this performance, more Model 953 Besly Grinders were purchased until now the shop has eight 953's, six for beveling blades, and two more for grinding a flat surface on both mower blades and of a smaller guard plate.

# Grinderscope

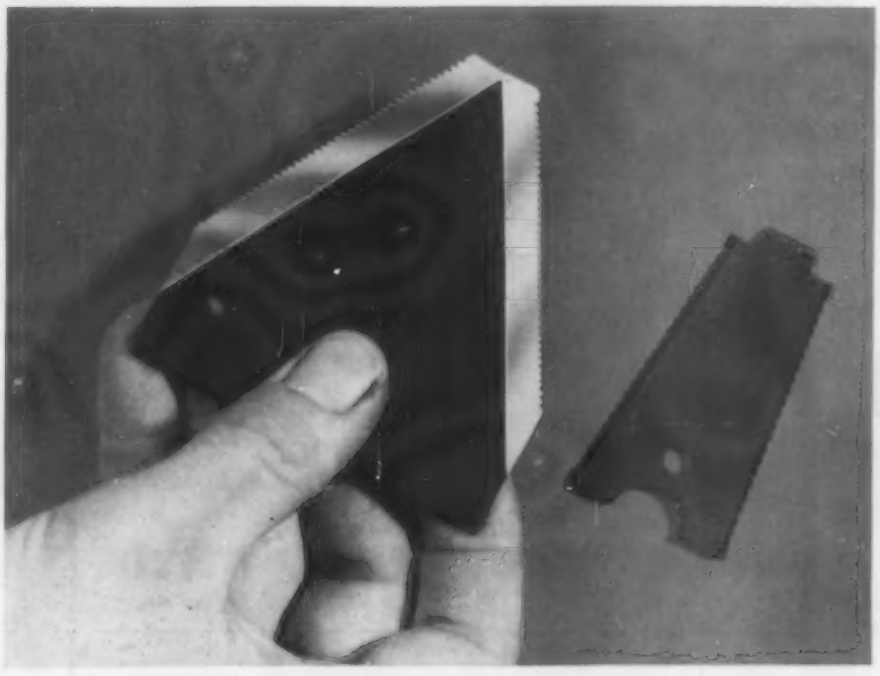
**News and Views About Ways to Cut Costs with Machines and Methods from Besly-Welles Corporation, Beloit, Wisconsin.**

## Besly at International Harvester

At the McCormick Works, the Besly Grinders are magazine loaded. Blade blanks are stacked into a twin hopper and automatically fed two at a time onto an inclined fixture on the rotary table. Before the table passes beneath the abrasive disc the blades are clamped and a 22° bevel is ground on one side of each blade. After grinding, the blades are automatically discharged in two rows onto a conveyor belt. The operator then collects the blades and re-loads them into the second side of the feed hopper so that the second surface can be beveled. This set-up produces blades ground on two edges at a rate of 24 per minute on 11 gauge material and 36 per minute on 14 gauge material. Some blades are then serrated along the ground edges and run through the Besly Facing Grinders which remove .004"-.006" from the underside of the serrated surface to insure a sharp edge. This facing operation is done at a rate of 6000 to 7200 blades per hour.

The Besly Grinders have been used continuously since they were installed, running at peak periods two and even three shifts per day. Maintenance has been negligible with only routine overhauls necessary to replace worn fixtures. The Besly 953 Vertical Spindle Grinder is one of the many precision grinders in Besly's complete line. It can also be used for high production grinding of all sorts of small parts. A variety of fixturing arrangements are possible. For full details, write to Besly-Welles Corporation, Beloit, Wisconsin.

Magazine loading of mower blades into Besly 953 Grinder. Right hand hopper holds unground blanks, left hand hopper holds blanks with one edge beveled. Two blades at a time are automatically loaded onto inclined fixture on rotary table of grinder.



Finished mower blade (above) is beveled on two edges and the underside is ground after serrations are made and the part heat treated. Guard plate (right) is face ground on the underside surface at the rate of 7,800 pieces per hour.

# Grinderscope

**News and Views About Ways to Cut Costs with Machines and Methods from Besly-Welles Corporation, Beloit, Wisconsin.**

# NEW "LH" BOND*

## Stops "Loading" and "Gumming" in BESLY-TITAN ABRASIVE DISCS and WHEELS

### Increases Wheel Life and Cutting Efficiency

A new Resinoid bond used in Besly-Titan Abrasive Discs and Wheels has unique characteristics that provide longer life and increased cutting action. Termed the Besly-Titan "LH" Bond*, it employs such a small amount of resin that all tendency to "gum" or "slick over" from heat created in grinding is virtually eliminated.

Discs and wheels can be furnished custom-made to your needs with any desired characteristics — even very hard grades — without loading them with non-cutting elements. Result is greater grinding efficiency and lower abrasive cost.

A simple trial will prove to you the savings and improved work you get with new "LH" Bond* custom-made Besly-Titan Discs and Wheels. Ask us to run one for you.

*Patent Pending

***Besly-Titan Resinoid Bonded Discs and Wheels Can Cut Grinding Costs on Your Jobs, Too***

At one of the country's most prominent manufacturers, a Besly-Titan Steel-Bac Abrasive Disc like this (weight 305 lbs., regular resinoid bond) removes 12,500 lbs. of material from *hardened* steel parts, *without burn.* This is at an abrasive cost of *only 1½c per pound of metal removed!*

Besly-Titan "Job-Fitted" wheels and discs cost no more than "stock" wheels — but we'll *prove* savings and work improvement. Write us.

***NEW CATALOG*** . . . Ask now for your free copy of this completely new Abrasive Disc and Wheel Catalog.

**BESLY-WELLES CORPORATION** 188 Dearborn Ave., Beloit, Wisconsin

Please send following free bulletins

- ☐ New Bulletin 200 on Besly Double Horizontal Spindle Grinders
- ☐ New Bulletin 700 on Besly-Bowen Radial Head Grinders
- ☐ Send New Abrasives Catalog

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

BESLY TITAN

**ABRASIVES**

SOLID DISCS • PERFORATED DISCS
CYLINDERS • WHEELS

**BESLY-WELLES CORPORATION**

20 N. Wacker Drive • Chicago 6, Illinois

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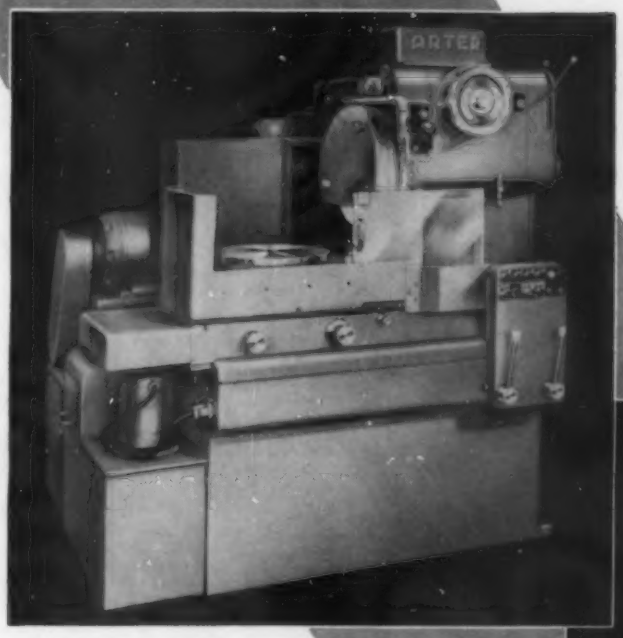
# ARTER FAMILY OF GRINDERS

## at the MACHINE TOOL SHOW

**Sept. 6-17 • Booth 1308**

A GENERATION of experience stands behind the ARTER family of grinding machines. Progressively these machines have attained advanced techniques, simplification of grinding processes, closer tolerances. Today ARTER is proud of the family including the newest members, Models E and F Rotary Surface Grinders, making their bows at the Tool Show.

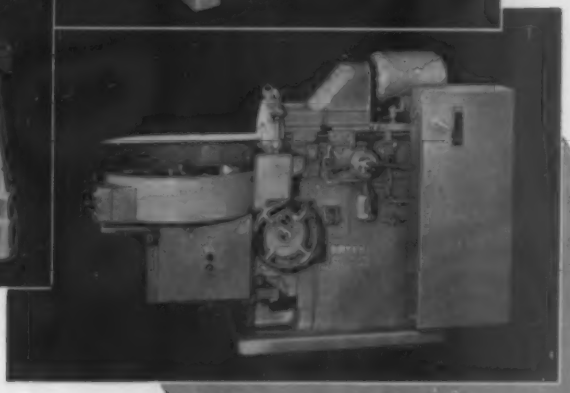


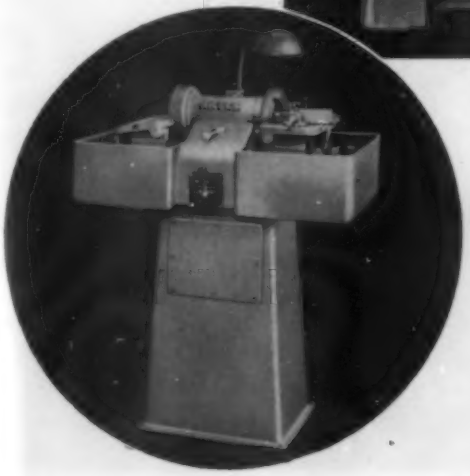
MODEL E — 12" AND 16" ROTARY SURFACE GRINDER

MODEL F 12" ROTARY SURFACE GRINDER

MODEL D—SPECIAL SEMI-AUTOMATIC ROTARY SURFACE GRINDER ARRANGED WITH WORK-LOADING AND PUSH BUTTON GRINDER CYCLE

MODEL 103— CYLINDRICAL AND INTERNAL GRINDER





MODEL 200 CARBIDE TOOL GRINDER

**ARTER GRINDING MACHINE CO.**

WORCESTER • MASSACHUSETTS

*Agents in industrial centers of United States and Canada*

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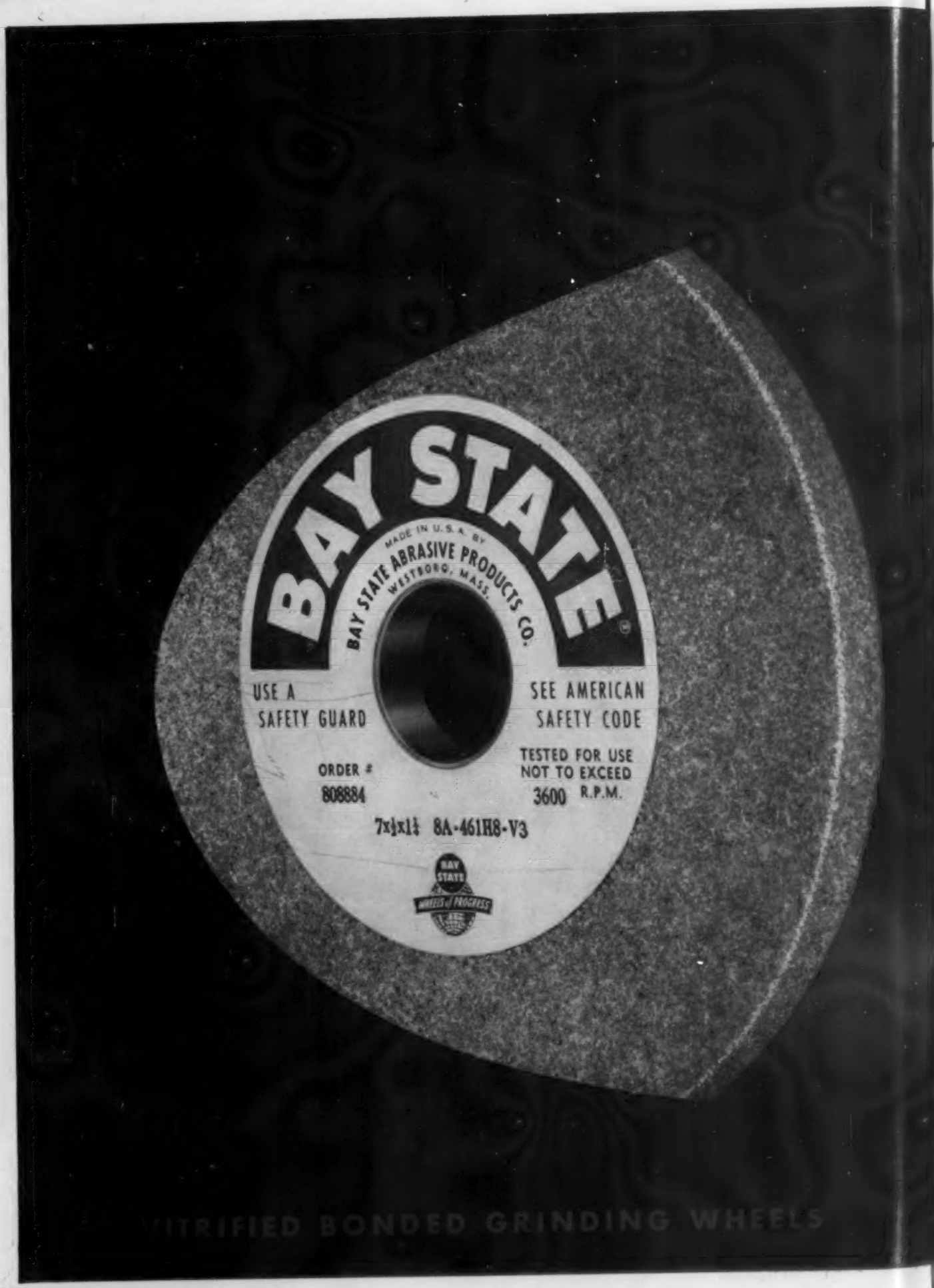
BAY STATE
MADE IN U.S.A. BY
BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO, MASS.
USE A
SAFETY GUARD
SEE AMERICAN
SAFETY CODE
ORDER #
808884
TESTED FOR USE
NOT TO EXCEED
3600 R.P.M.
7x1/4x1 1/4 8A-461H8-V3
BAY STATE
WHEELS of PROGRESS
VITRIFIED BONDED GRINDING WHEELS

# Available...

## TWO EXTRA OPPORTUNITIES!

For each single hardness grade standard in the industry for precision grinding, BAY STATE makes *three* grade divisions. These "Fractional Grades" provide you with two *extra* opportunities to get a closer "fit" of vitrified bonded wheels for your grinding operations.

This extra refinement is standard at BAY STATE. Such close control, developed through advanced manufacturing techniques, means that BAY STATE does a *better* job of duplicating successful wheel specifications.

For improved precision grinding, get the *extra* benefits of "Fractional Grades" . . . with BAY STATE "WHEELS OF PROGRESS".

*HERE'S PROGRESS IN GRINDING*

(a) **FRACTIONAL GRADES** (b)

The three wheels above vary only in hardness. The middle one, with the figure 2 marked by the arrow, has an exact hardness of grade H.

It is flanked by the two *extra* grade divisions you can get from BAY STATE:

(a) 1 means 1/3 *softer* in grade H.
(b) 3 means 1/3 *harder* in grade H.

Such extra, *standard* specifications mean progress in grinding for you . . . from BAY STATE.

BAY STATE ®

*WHEELS of PROGRESS*

**BAY STATE ABRASIVE PRODUCTS CO., Westboro, Massachusetts, U. S. A.**

Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

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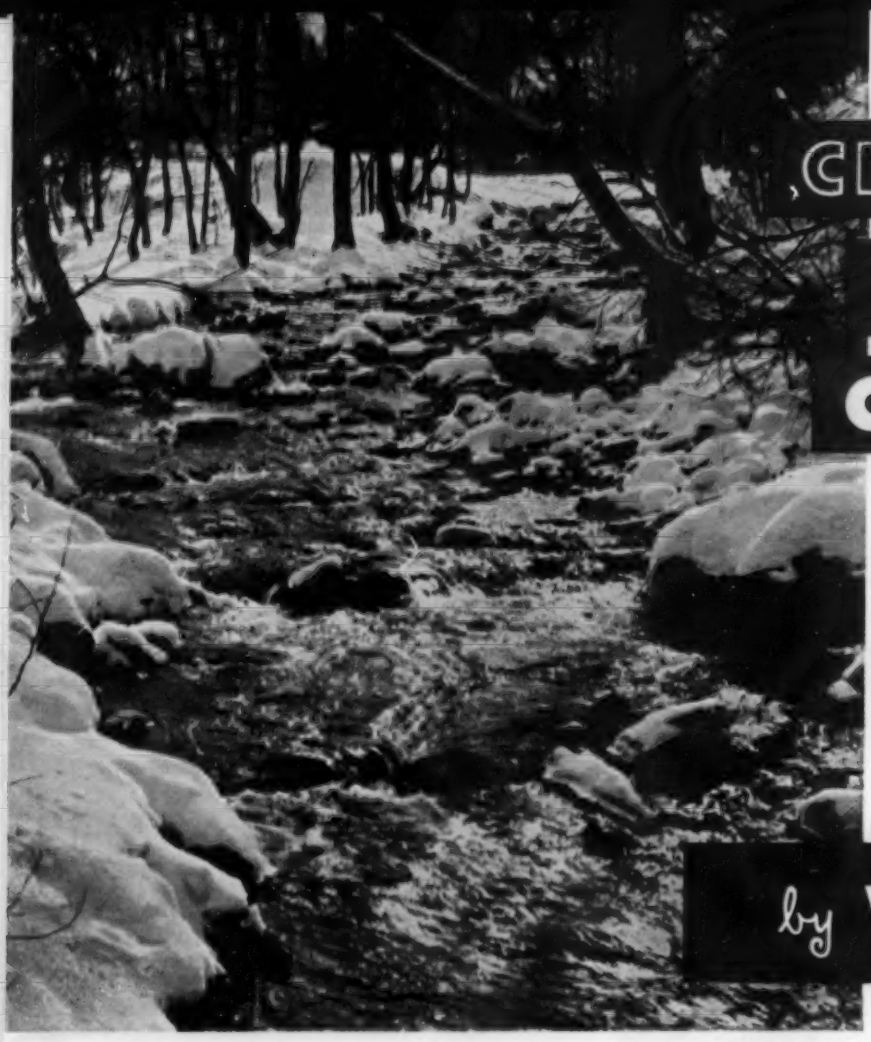

# CLEAR
# COOL
# CLEAN

## TRIPLE C* GRINDING COOLANT

by MOTCH & MERRYWEATHER

## in either *liquid* or *crystalline* form

**CLEAR.** Triple C solutions are transparent and stable. You can watch the progress of your work. You will experience no foaming. With Triple C there is no emulsifying action on hydraulic or lubricating oils.

**COOL.** Uniform, complete wetting of metal provides maximum cooling. No steam or smoke; quicker, cooler, safer handling of work-pieces by your operator . . . *Results:* increased accuracy and higher production.

**CLEAN.** Grinding wheels stay clean and free-cutting. Fewer dressings reduce wheel cost. Clean machines remain free of caked residue. *Triple C on floors and clothing dries without residue or odor.* Filters do not clog.

The exceptional advantages of Triple C Grinding Coolant are available in either liquid or crystalline form. Triple C is the only coolant intended primarily for wet grinding which offers this option . . . Where shipping costs and storage space are not prime considerations, *Liquid* Triple C is frequently specified. Moreover, *Liquid* Triple C affords extra protection against rust and grinding odors . . . *Crystalline* Triple C saves space. Readily soluble, it possesses the clear, cool, clean qualities which are so desirable in a grinding coolant.

*— Your M & M dealer carries Triple C Grinding Coolant in stock —*

**THE MOTCH & MERRYWEATHER MACHINERY CO.**
CUTTING TOOL MANUFACTURING DIVISION
CLEVELAND 17, OHIO

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*TRADE MARK

*for results you can see . . .* TRIPLE C FOR ALL WET GRINDING

INTERNAL

FLAT RECIPROCATING

EXTERNAL

FLAT ROTATING

CENTERLESS

RIPLE C BRINGS A CLEAN DEAL TO YOUR MACHINES, OPERATORS, AND SHOP

# Take Production Away From Labor

PRODUCTION, production, production, was the cry a few years ago, and as long as people manufacture products for a profit this cry will always echo down the aisles and the length and breadth of the bays. However, another monster is gaping for attention: the exorbitant cost of labor in relation to poor individual man/hour output. As long as the demand for production was countered with a commensurate wage, return control over both production and cost could be determined. From an economic standpoint, as well as from that of sound management, wages must be based on productivity. This is fundamental. It is a law of nature: a just return in relation to effort.

Now we are in the midst of a changing philosophy. No longer does a worker expect to be paid in relation to his output, he expects, and does, receive payment on the basis of industry-wide precedence, which in turn is based on such general economic factors as general economic conditions, cost of living, profits and sales. Thus, a small shop in New Jersey, just getting by, may be faced with wage demands based on an industry precedence set in Detroit or Pittsburgh or Akron. Local wages, based on merit—or productivity, if you will—are slowly disappearing. There is a general equalizing of high wages and low production; a general equalizing of the superior, the mediocre, and the inferior worker.

No plant, no industry, no economy is safe from this creeping strangulation.

As with all problems, there is an answer to this one; as a matter of fact, there are several. The one we are concerned with today is that one propounded by industry itself and which may be found in Chicago in September: Take away from labor the control over production.

We have seen giant-like progress in this direction: special machines with but one operator who is more of a watchdog than a machinist; tape controlled machines with a secretary at a keyboard and a watchdog at the machine. We have but scratched the surface of tape, or similarly controlled, machine tools.

In standard tools the shift is in the same direction: pre-selection; automatic shifts; automatic clutches; in fact, any automatic device which will eliminate human control over the production cycle has been designed into many machines to be displayed at the show. To be sure, much remains to be done; but in comparison to the standard machines of only eight years ago, the progress is encouraging.

If we approach our cost/production problem with the idea of eliminating labor entirely we are doomed to wretched failure. We do not think industry believes it either possible or wise to do so, although some visionaries exploit the elimination-of-labor view with vehemence, if poor logic. However, if we can control production independently of labor something might be gained. And yet, you know, there are a lot of flaws here also.

At any rate, come to Chicago and look around. When you're at the Amphitheatre stop in booth number 121 (Hitchcock Publishing Company) and say hello.

William F. Schleicher

# CHICAGO

## September 6-17

### THREE BIG CHICAGO SHOWS

**International Amphitheatre:** (Machine Tool Show) 42nd and Halsted Sts.
Hours—10:00 a.m. to 5:30 p.m. daily, Tuesdap, Sept. 6 through Saturday, Sept. 17, excepting Sunday, Sept. 11.

**Navy Pier:** (Production Engineering Show) On Lake Michigan at Grand Ave.
Hours—1:00 p.m. to 10:00 p.m. daily, except Sunday, Sept. 11.

**Chicago Coliseum:** (Coliseum Machinery Show) 1513 S. Wabash Ave.
Hours—daily, except Sunday, 10:00 a.m. to 10:30 p.m.

• NEXT MONTH Chicago will become the world headquarters of the metalworking industry for 10 days when three giant industrial shows will be staged simultaneously.

More than 200,000 business and shop executives will descend on the city for the biggest industrial display of machines and accessories ever staged.

The International Amphitheatre will house nearly 200 exhibitors at the show sponsored by the National Machine Tool Builders' Association. Emphasis in all exhibits will be placed on the cost-cutting potential of modern machine tools and the economic hazard of machine tool obsolescence.

Navy Pier will be the scene of the Production Engineering Show. This exhibit will concentrate on automation and automatic processes. Equipment to be shown falls into eight major categories: monitoring, governing, handling, communications, inspection, and gaging equipment, machine tool accessories, equipment components and special production equipment.

The Metalworking Machinery & Equipment Exposition has been named the "Coliseum Machinery Show" because of location. This site was chosen because of its convenient location in the heart of the city.

An innovation in transportation will be scheduled helicopter passenger service between the Machine Tool Show and the Production Engineering Show. Helicopter service will implement fleets of buses which will also shuttle visitors between the two shows and between loop hotels and the shows.

William E. Rutz, chairman of the machine tool show committee, has announced that show invitations have been issued to a number of government executives, including all branches of the armed forces. • •

**Chicago's skyline, with Grant Park in the foreground. This view was taken from the steps of the Museum of Natural History at the south end of Grant Park. Park and museum are within pleasant walking distance of the loop.**

**The Museum of Natural History. This, as well as the Museum of Science and Industry in Jackson Park, is among the better museum of its kind in the country.**

# DOWNTOWN CHICAGO

Visitors to the Machine Tool Shows will find many points of interest within easy reach of the downtown loop area. This map provides the location of the major hotels and points of interest, including parks and museums.

Prepared for the Chicago Convention Bureau

# CHICAGO DISTRICT MOTEL DIRECTORY

This list of motels with route numbers, locations, mileage from Chicago's downtown loop, and number of motel units (U), is intended as an aid to motorists attending the three Chicago Shows. (See map on opposite page.)

**1—Lystlund's Resort—Route 21 and 83**
Antioch, Ill. 55 Mi. N.W. of Chicago

**2—Murrie's Motel**—13U—
**U. S. 41 and State 173**—
Rt. 1, Box 201A, Zion, Ill.
50 Mi. N. of Chicago

**3—Rosecrans Motel**—13U—
**Zion Hwy. 41 and 173**
Zion, Ill. 50 Mi. N. of Chicago

**4—De Young's Court**—6U
Winthrop Harbour, Ill. 50 Mi. N. of Chicago

**5—Sheridan Lodge**—6U—**U.S. 42**
Zion, Ill. 50 Mi. N. of Chicago

**6—Du Bell Modern Motel**—14U—
**Hwy. 12 & Nippersink Dr.**
Fox Lake, Ill. 50 Mi. N.W. of Chicago

**7—Arnold's Motel**—17U—
**U.S. 12-1¼ Mi. S.**
Fox Lake, Ill. 50 Mi. N.W. of Chicago

**8—Lagoon Motel**—10U—**U.S. 12**
Fox Lake, Ill. 50 Mi. N.W. of Chicago

**9—El Rancho Motel**—10U—**U.S. 41 & State 63**
Waukegan, Ill. 45 Mi. N. of Chicago

**10—Geo's Cabin Courts**—16U—
**U.S. 41 & State 63**
Waukegan, Ill. 45 Mi. N. of Chicago

**11—Clausen's Court**—8U—**7 Mi. N. of Waukegan on U.S. 42**
Winthrop Harbour, Ill.
45 Mi. N. of Chicago

**12—Winthrop Motel**—9U— **7 Mi. N. of Waukegan on U.S. 42**
Winthrop Harbour, Ill.
45 Mi. N. of Chicago

**13—Slumberland Motel**—9U— **2 Mi. W. on Hwy. 120 Between Hwy. 131 & U.S. 41**
Waukegan, Ill. 45 Mi. N. of Chicago

**14—Doc's Motel**—14U— **U.S. 24 & State 100**
Libertyville, Ill. 40 Mi. N.W. of Chicago

**15—Tafel's Motel**—12U—
**State Hwy. 31 at Carey Rd.**
Algonquin, Ill. 35 Mi. N.W. of Chicago

**16—Wheeling Motel**—9U— **on Hwy. 21 and U.S. 45**
Wheeling, Ill. 25 Mi. N.W. of Chicago

**17—Clearview Motel—Route 21 and 45**
Wheeling, Ill. 25 Mi. N.W. of Chicago

**18—Ren-Dell Motel—Route 21 and 45**
Wheeling, Ill. 25 Mi. N.W. of Chicago

**19—Palatine Ridge Motel**—10U—
**U.S. 14 & State 53**
Palatine, Ill. 20 Mi. N.W. of Chicago

**20—Colonial Lodge Motel**—14U—
**U.S. 20 East edge of city**
Elgin, Ill. 30 Mi. N.W. of Chicago

**21—Joel Motel**—11U— **U.S. 20 and 59, 4 Mi. E. of Elgin, Ill.**
30 Mi. N.W. of Chicago

**22—The Keyes Motel**—18U—
**U.S. 12 in town.**
Arlington Heights, Ill.
18 Mi. N.W. of Chicago

**23—Rand Manor Motel**—20U—**N. edge on U.S. 12, 2 blks. N.W. of Jct. 12 & 45.**
Des Plaines, Ill. 18 Mi. N.W. of Chicago

**24—Landmeier's Beauty Rest Motel**—12U—
**Corner State 83 & Landmeier Rd. ½ Mi. S. of Route 72.**
Arlington Heights, Ill.
18 Mi. N.W. of Chicago

**25—Ranch House Motel**—20U—
**State 62, 1 block N. of Touhy Ave. (Algonquin Rd.)**
Park Ridge, Ill. 16 Mi. N.W. of Chicago

**26—Lasche Motel**—20U—**Hwy. 64 near St. Charles.**
St. Charles, Ill. 30 Mi. W. of Chicago

**27—Du Wayne Motel**—30U—
**Route 64, 2½ Mi. E. of Route 59**
West Chicago, Ill. 28 Mi. W. of Chicago

**28—Jennie Peterson Motel—Route 64**
West Chicago, Ill. 28 Mi. W. of Chicago

**29—Bailey's Motel**—12U—
**1 Mi. W. of Addison, Ill. on Route 20.**
Elmhurst, Ill. 18 Mi. W. of Chicago

**30—Holiday Motel**—9U—**U.S. 20 just W. of Route 83**
Elmhurst, Ill. 18 Mi. W. of Chicago

**31—Arcadia Motel**—18U—**U.S. 20 & 83**
Elmhurst, Ill. 18 Mi. W. of Chicago

**32—Traveler's Rest Tourist Court**—14U—
**U.S. 20, ¼ Mi. E. of 83.**
Elmhurst, Ill. 18 Mi. W. of Chicago

**33—West Wind Motel—Alt. 30, 3 Mi. W. of Wheaton**
West Chicago, Ill. 28 Mi. W. of Chicago

**34—TV Motel—Alt. 30 & Meyers Rd.**
Lombard, Ill. 20 Mi. W. of Chicago

**35—Daniel's Auto Court**—12U—**U.S. 30**
Aurora, Ill. 30 Mi. S.W. of Chicago

**36—Hansen's Motor Court**—26U—
**U.S. 30 S. Edge**
Aurora, Ill. 30 Mi. S.W. of Chicago

**37—Metzger's A-1 Cabins**—13U—
**New York St. on Rt. 65**
Aurora, Ill. 30 Mi. S.W. of Chicago

**38—The Curve Motel**—8U—
**U.S. 34, 7 Mi. E. of Aurora**
Naperville, Ill. 25 Mi. W. of Chicago

**39—Naperville Motel—Route 34, Ogden Ave.**
Naperville, Ill. 25 Mi. W. of Chicago

**40—Greentree Motel—Route 34, Ogden Ave.**
Naperville, Ill. 25 Mi. W. of Chicago

**41—L A Motel—U.S. 34**
Downers Grove, Ill. 23 Mi. W. of Chicago

**42—Friendly Motel**—6U— **U.S. 34**
Brookfield, Ill. 16 Mi. W. of Chicago

**43—Peterson's Royal Motel**—11U— **U.S. 34**
Brookfield, Ill. 16 Mi. W. of Chicago

**44—LaGrange Motor Hotel**—18U—
**Hwy. 45-12 & 20**
LaGrange, Ill. 15 Mi. W. of Chicago

**45—Wishing Well Court**—10U—
**Route 66, ½ W. of 12 & 20-45**
LaGrange, Ill. 15 Mi. W. of Chicago

**46—Blackhawk Motor Court**—10U—
**Rt. 66 at Wolf Rd.**
LaGrange, Ill. 15 Mi. W. of Chicago

**47—Casa Blanca**—10U—**U.S. 66, ½ Mi. W. of Jct. 66 with U.S. 12, 20 & 45**
LaGrange, Ill. 15 Mi. W. of Chicago

**48—Redwood Lodge Motor Court—U.S. 66, 1 blk. W. of Jct. with 12, 20 & 45**
LaGrange, Ill. 15 Mi. W. of Chicago

**49—Sleepy Hollow Motel**—13U—
**U.S. 30, 5½ Mi. N.W.**
Joliet, Ill. 50 Mi. S.W. of Chicago

**50—Manor Motel**—40U— **U.S. 6 & 66 at over-pass**
Joliet, Ill. 50 Mi. S.W. of Chicago

**51—The Vista Motel**—10U— **U.S. 6 at Jct. 6 & 7**
Orland Park, Ill. 25 Mi. S.W. of Chicago

**52—Don's Motel**—10U— **U.S. 6 & 45**
Orland Park, Ill. 25 Mi. S.W. of Chicago

**53—Virginia Motor Court**—28U—
**U.S. 6 & 45**
Orland Park, Ill. 25 Mi. S.W. of Chicago

**54—Hi-Way Motel**—9U— **U.S. 6, 3 Mi. W. of Jct. State 1**
Harvey, Ill. 20 Mi. S. of Chicago

**55—Bel-Aire Motel**—11U— **U.S. 6, 1 blk. W. of State 1**
Harvey, Ill. 20 Mi. S. of Chicago

**56—Chicago Motel**—8U— **U.S. 6 in South Holland**
Harvey, Ill. 20 Mi. S. of Chicago

**57—Dutch Mill Motel**—7U—**U.S. 6 & Alt. 30**
Lansing, Ill. 23 Mi. S. of Chicago

**58—Lan-Oak Motel**—9U— **U.S. 6 & Alt. 30**
Lansing, Ill. 23 Mi. S. of Chicago

**59—The Brant Motel**—21U—**U.S. 41, ½ Mi. S. of U.S. 6**
Highland, Indiana 27 Mi. S.E. of Chicago

**60—Bob's Deluxe Motel**—38U—**U.S. 41, 5 Miles S.E. of Hammond ½ Mi. S. of Jct. 6 & 41**
Highland, Ind. 26 Mi. to Chicago

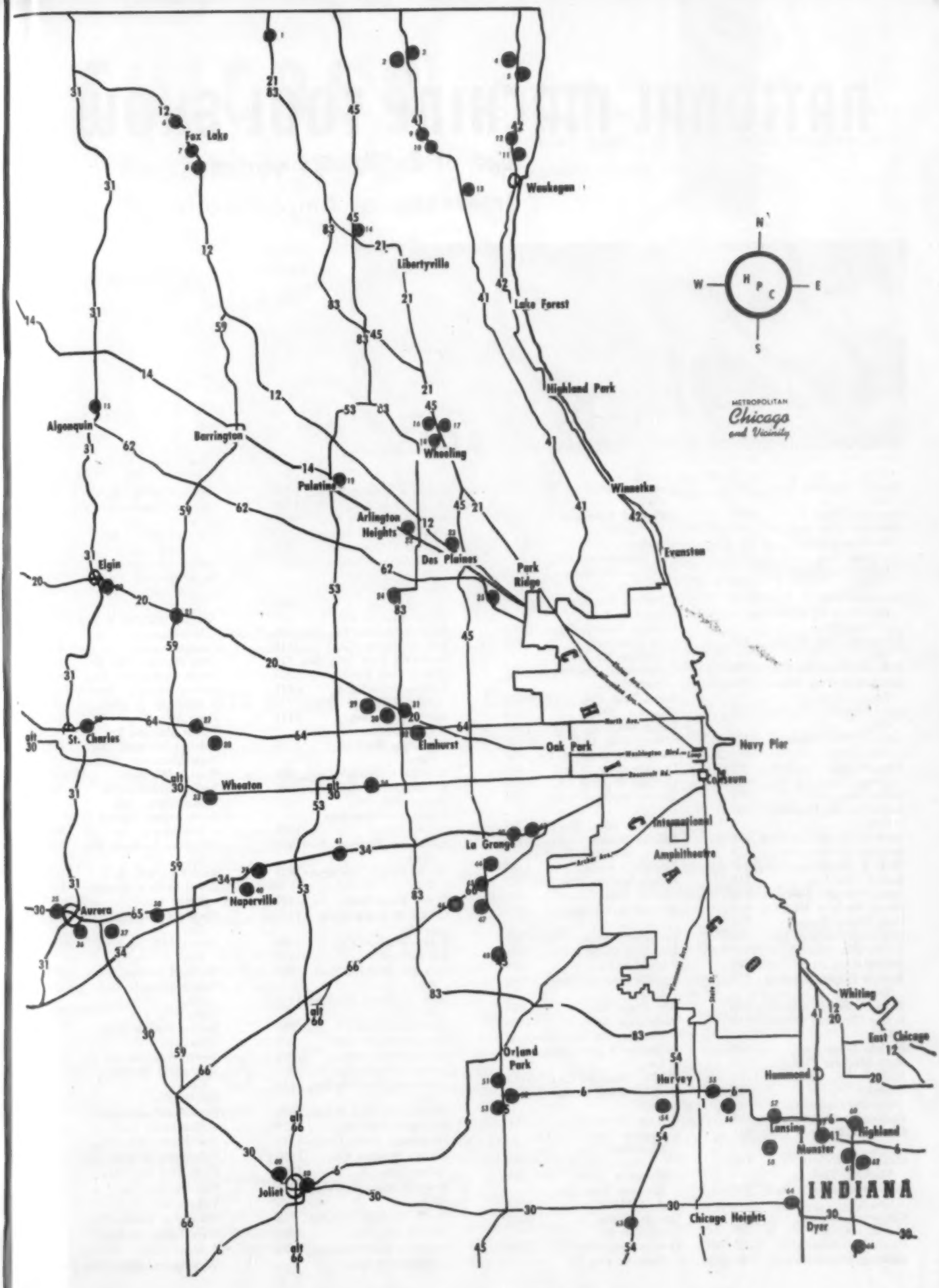
**61—Mecca Motel**—6U— **U.S. 41, ¼ Mi. S. of U.S. 6**
Munster, Ind. 28 Mi. S.E. of Chicago

**62—Midwest Motel**—11U—**U.S. 41, ¼ Mi. S. of U.S. 6**
Munster, Ind. 28 Mi. S.E. of Chicago

**63—Covert Motel—S. edge on U.S. 54**
Matteson, Ill. 30 Mi. S. of Chicago

**64—Long's Tourist Court**—11U—
**U.S. 30 at Indiana State Line**
Chicago Heights, Ill. 28 Mi. S.E. of Chicago

**65—Plaza Motel**—20U—
**U.S. 41, S. of U.S. 30**
Dyer, Indiana 35 Mi. S.E. of Chicago


Fox Lake
Waukegan
Libertyville
Lake Forest
Highland Park
Algonquin
Barrington
Palatine
Wheeling
Winnetka
Arlington Heights
Des Plaines
Park Ridge
Evanston
Elgin
St. Charles
Elmhurst
Oak Park
Navy Pier
Wheaton
Coliseum
La Grange
International Amphitheatre
Naperville
Aurora
Whiting
East Chicago
Orland Park
Harvey
Hammond
Lansing
Highland
Munster
Joliet
INDIANA
Chicago Heights
Dyer
N
W
E
S
METROPOLITAN
Chicago
and Vicinity

# NATIONAL MACHINE TOOL SHOW

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American Steel Foundries, King Machine Tool Div., 1121
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Boye & Emmes Machine Tool Co., 314
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Cincinnati Gilbert Machine Tool Co., 816
Cincinnati Lathe & Tool Co., 309
Cincinnati Milling Machine Co., 306 & 1205
Cincinnati Shaper Co., 1105
Clearing Machine Corp., 716
Cleereman Machine Tool Co., 1007
Cleveland Automatic Machine Co., 412
Cleveland Crane & Engineering Co., 1418
Cleveland Grinding Machine Co., 810
Cleveland Tapping Machine Co., 409
Colonial Broach Co., 1112
Cone Automatic Machine Co., Inc., 401
Consolidated Machine Tool Corp., 217
Covel Mfg. Co., 720
Cross Co., The, 1118
Danly Machine Specialties, Inc., 1302
Davis & Thompson Co., 602
Denison Engr. Co., 819
DeVlieg Machine Co., 1317
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Foote-Burt Co., 1409
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Gemco Shaper Co., 706
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Lodge & Shipley Co., 502
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Micromatic Hone Corp., 1211
Minster Machine Co., 1410
Moline Tool Co., 1304
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Morris Machine Tool Co., 912
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Sundstrand Machine Tool Co., 1412
Taft-Peirce Mfg. Co., 811
Thompson Grinder Co., 1407
U. S. Tool Co., Inc., 215
Van Norman Co., 905
Vickers, Inc., 814
Warner & Swasey Co., 717
Wiedemann Machine Co., 1420
Wysong and Miles Co., 913

# CHICAGO

## September 7-16

Shown on the following pages are some of the Grinding, Honing and Lapping Machines which will be on display at the National Machine Tool Show, International Amphitheatre.

One of six of Abrasive Machine Tool Company's Surface Grinders begins its journey to Chicago. Left to right: N. Douglas Mac Leod; R. Bruce Mac Leod.

## Abrasive's New 824 Surface Grinder . . . Dustsnaire Exhauster .....Booth 317

**Abrasive Machine Tool Co., East Providence, R.I.**

1. Built for either production or tool room use, the new 824 hydraulic-feed surface grinder has a ballway cross-feed plus an accurate anti-backlash cross-feed screw. The 824 can grind slots or shoulders to closer tolerances than previously possible with a similar power-feed surface grinder.

2. Abrasive's Dustsnaire is a filterless dust exhauster and separator that operates on both the cyclone and vacuum principles for efficient removal of light particles from large areas. The Dustsnaire uses only one-half horsepower to draw 6.5 inches of water and to separate down to 5 microns of a specific gravity of 1.5. It will process 309 cubic feet of air per minute. Nozzle attachment exhausts sparks from any grinding wheel.

3. Graduating Machine designed for its own use for dials and handwheels. Now marketed in quantity, it will graduate straight or angled surfaces with from 40 to 1000 graduations with any combination of length of line.

4. The new feature of the hand-feed Abrasive 1½ is the new stepless variable speed spindle. Now, with complete accuracy and safety, a wheel grinding at a constant 5500 surface periphery can be used from 12" to 6". The power conversion is electronically controlled without pulleys, gears or loss of wheel torque. The electronic speed control is accurate within 5% and requires infrequent maintenance.

5. With added weight and width the Abrasive 1224 incorporates the same new features of the 824 including the easily maintained separate hydraulic unit and patented shielded ways. In spite of its size and 4440 pound weight it provides tool room accuracy plus the x 24" x 18".
ability to handle a cube measuring 12"

6. The Abrasive 18" Face Grinder incorporates a motorized spindle, large rugged base, knee, saddle and table. Powered with a 15 horsepower motor, it easily and accurately removes up to ¼" of metal stock on each pass. This machine is used by many large die shops throughout the country. • •

## Anderson's Three New Products .....Booth 225

**The F. E. Anderson Oil Co., Inc. Portland, Conn.**

1. Lusol K-7, the new transparent grinding solution, for use on all steels. Suited for cast and malleable irons, titanium, carbon, rubber, ceramics and plastics. Non-foaming, it runs absolutely flat under all conditions. Gives rust protection at low dilutions, even on sensitive metals such as cast or malleable irons, and maintains clean wheels at all times.

2. Lusol Shamrock is a water soluble chemical emulsion possessing good cooling and excellent extreme pressure lubricating properties. Suited to operations where maximum lubricity is required. Designed for use in all machine tools, including automatic screw machines. Useful when machining at moderate feeds and speeds, or where extreme pressure lubricity is needed as in drawing, stamping, broaching, etc.

3. Lusol Unikool is a new chemical type cutting fluid which provides an all-purpose coolant at moderate cost. Combines good cooling with lubricating effect and with the obvious advantage of transparency. • •

## Arter's Tape Controlled Positioning Table ....Booth 1308

**Arter Grinding Machine Co., Worcester, Mass.**

Arter Grinding Machine Company will display at the National Machine Tool Builders' Association Show in Chicago September 6-17, their "JIG-MATIC" Tape Controlled Electronic Digital Positioning Table.

1. A new device for automatically positioning a work piece under or in front of a drill, tap, boring tool, etc. It eliminates the necessity of the operator manually moving a drilling head and arm as in a radial drill, or a slide as in other machines, to positions indicated by reading a dial, a vernier measurement or by setting stops.

The control of movement is in the tape. Operator is not responsible for the accuracy of hole spacing but only for the machining operation. Eliminates making of jigs, special measur-

**Arter "Jigmatic" tape controlled electronic digital positioning table eliminates manual operations involved in positioning table for drilling, boring, tapping, etc.**

ing rods or accurate adjustable screw rods.

On a given size table several hundred holes can be drilled, limiting factor being only the length of tape that can be handled on the reels. Table can be moved in .001" increments; no resetting of work after having drilled a small number of holes.

The tape is punched from engineering drawings, the holes being dimensioned decimally from X and Y coordinate axes. A template type hand punch can be used. Once the tape is correctly inserted in the reader of the console (which can be located anywhere) the operator simply presses a button to move the tape to the first and then to successive drilling positions.

The unit to be shown has a work table positioning capacity of 20" x 30". It comprises a base and two slides at 90° to each other. Each slide is independently driven by 1 H.P. motors and both move at the same time. Maximum spacing time is 15 seconds. Accuracy of positioning is .001" in 10 inches.
2. Also to be shown: line of Arter Grinding Machines. • •

## Barnes Honing Machines and Coolant Separators

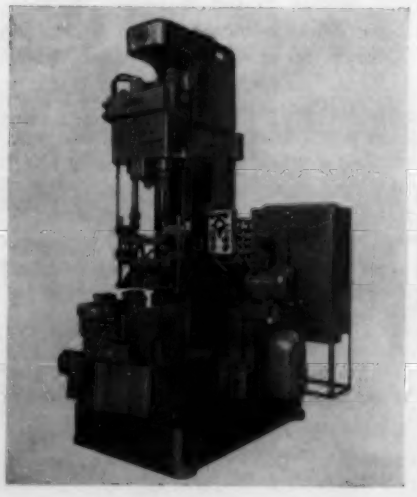
## Booth 818

**Barnes Drill Co., Rockford, Ill.**

1. This incorporates the latest developments of the honing process — Electronic Hone Expansion and Plugmatic bore-to-bore sizing.

The unit will be set up complete with quick-loading honing tools using extra-deep Plast-I-Clad honing stones, fixtures, and indexing table for production honing the 2.3115 in. I.D. x 3⅛ in. long bore of an aluminum alloy cylinder block. With .002 in. to .003 in. stock removal, the bore is maintained within .0005 in. for size and geometric accuracy and production of 300 cylinders per hour.

**Barnesdril Model 224-2 Honing Machine**



2. A new Honing machine for high production precision honing of 3 in. length. Machine is equipped with air-electric hone expansion, Plugmatic bore-to-bore sizing, automatic loading, gauging equipment for checking and ejecting parts mounted for the honing operation, and BarnesdriL honing tools.

Bores of transmission gears will be honed on a production basis during the show.

3. Combination Magnetic and Fabric Filter, Model MP-5 will provide a continuous contaminated coolant to the filter for cleaning.

The magnetic drum attracts and removes the major contaminant load, and the fabric filtering media removes the remaining foreign material to provide an extremely high degree of coolant clarity.

Fabric is preselected according to proper porosity for required limitation of particle size. With the use of the magnetic field for "first-stage" cleaning, the consumption of filtering media is minimized.

4. A Magnetic Separator will be incorporated into an operating display. To simulate actual operating conditions contaminated coolant will be delivered continuously to the separator.

5. Most recent developments in BarnesdriL honing tools and abrasives for use with electronic, hydraulic, and mechanical hone expansion. Honers will be equipped with BarnesdriL quick loading-type tools and Plast-I-Clad abrasives.

6. Also, various types of drive adapters, stone holders, Plast-I-Clad abrasives of the full depth, skirt, and clamp types, and a variety of sample parts.

7. Complete line of drilling machines.

**New Barnesdril Model 111 Honer**

**Barnesdril Kleenall "Two-Stage" Filter**

## Brown & Sharpe's Face Grinder Has Work Spindle in Horizontal Plane .....Booth 520

**Brown & Sharpe Mfg. Co., Providence, R.I.**

1. Because the work spindle is in a horizontal plane wider flexibility of work holding devices is obtained from the No. 11 Face Grinder. The work rotating in a vertical plane results in easy cleaning of the work holding surface, effective coolant application and extremely high surface quality of the work being ground.

Grinding with the periphery of the wheel, this machine will produce accurate, flat surfaces on work up to 10-in. dia. and up to 3-in. thick, on a

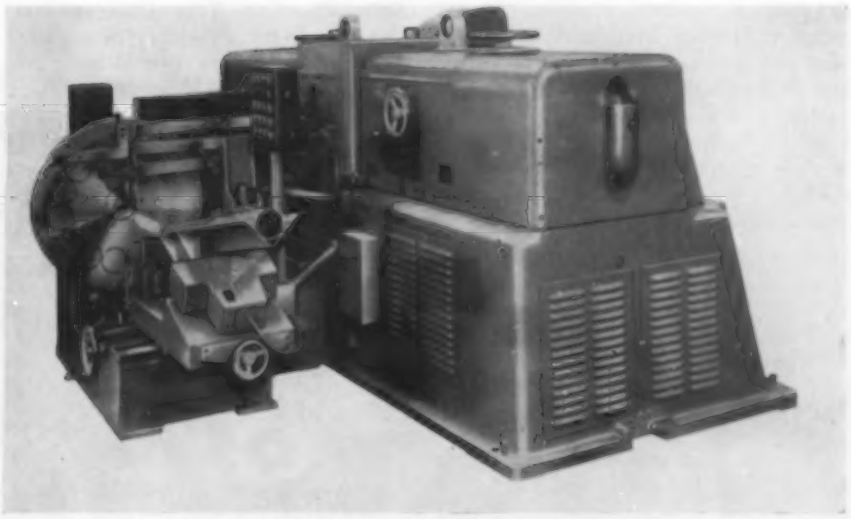
**Brown & Sharpe No. 11 Face Grinder with the work spindle in a horizontal plane.**

permanent magnetic chuck (4¾-in. with face chuck attachment). Accurate concave or convex surfaces up to 10° are ground as flat surfaces.

During the wheel truing operation the relative position of the finished face of the work piece to the diamond remains unchanged.

2. Also to be shown: Nos. 1 and 3 Universal Grinder; No. 5 Plain Grinder; No. 2L Surface Grinder; No. 13 Universal and Tool Grinder.

3. Also: Automatic and Hand Screw Machines; Milling Machines; Machinists' tools. • •



**Model 240 is equipped with Besly's exclusive sealed spindle quill construction.**

## Besly-Welles Double Horizontal Spindle Grinder
## Booth 911

**Besly-Welles Corp., Beloit, Wis.**

1. The new grinder Model 240, is equipped with Besly's exclusive sealed spindle quill construction. Heads are completely sealed, eliminating wear and its resulting inaccuracy. Permits smooth, accurate adjustment of the abrasive discs and avoids transmitting motor vibration to the grinding spindle.

All controls, motors, starters and hydraulic units enclosed within machine base. Controls are automatic and are accessible from either side of the grinder. Individual dressers for each disc are push button operated. Design of the grinder has cut down-time for dressing, disc changing and setup to one third.

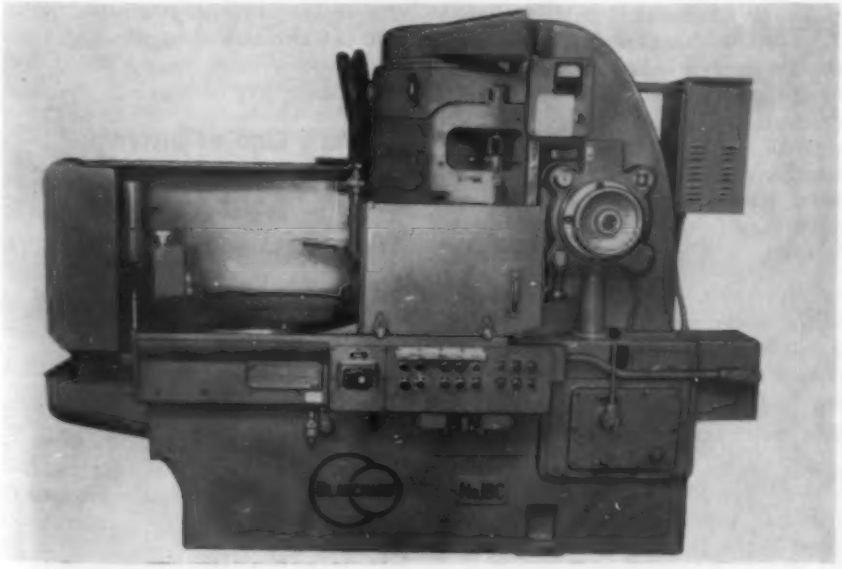
High speed feeding is achieved through a simple electro-magnetic pick-off disc which supplies work to the grinder in a continuous stream.

2. Also to be shown: selection of Horizontal and Vertical Disc Grinders. • •

## Blanchard's 18C Features Automatic Cycle Control
## Booth 406

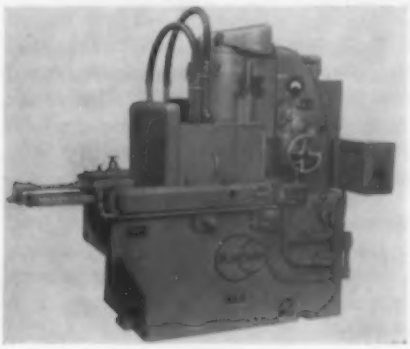
**The Blanchard Machine Co., Cambridge, Mass.**

**Blanchard's No. 18C performs automatically those operations previously performed by the operator, including maintaining of size control.**

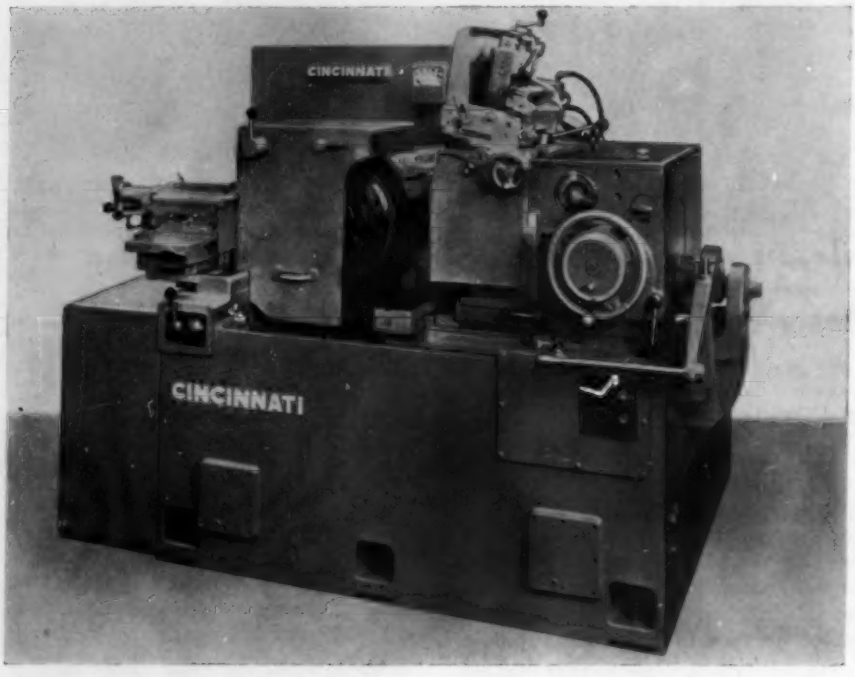


1. The No. 18C Grinder has been developed over a period of approx. 7 yrs. to accomplish by means of automatic cycle control, most of the operations ordinarily performed by the operator when running a standard No. 18 Grinder, including the most important item of size control. On suitable work, a tolerance of 1.0005 in. can be held in regular production. After initial setup, the operator simply loads work on magnetic chuck, closes direct current circuit to chuck, presses "Cycle Start" button, and the Grinder completes the grinding cycle, returning the chuck to the load-

**No. 11 standard Blanchard Vertical Spindle Rotary Table Surface Grinder.**



ing position without attention from operator. Another Blanchard development not previously exhibited at any show is the Blanchard Cylinder Wheel Holder which eliminates sulphuring cylinder wheels into rings and reduces the time required to change wheels.
2. Also to be shown: No. 11 Vertical Spindle Rotary Table Surface Grinder; Adjustable Gap Type Demagnetizer; Cylinder Wheel Holder; Assortment of Blanchard Abrasive Wheels and samples ground on Blanchard surface grinders. Monochromatic Light and Optical Flat for checking flatness of ground surfaces; display panels with assortment of photographs and catalogs. • •




**Cincinnati's No. 0 Centerless Grinder.**

## Cincinnati to Show Many New Machines - Booth 1205

**Cincinnati Milling Machine Co., Cincinnati, Ohio**

1. No. 0 Centerless Grinder is a small-sized, general purpose centerless designed for parts up to ½-in. dia. Spindle is mounted in Cincinnati's exclusive Filmatic spindle bearing. Bearings are self adjusting for heavy roughing cuts or light finishing cuts and require no maintenance. Spindle lubrication is automatic and positive.

Regulating wheel speeds are infinitely variable, under the control of a single handwheel, from 22 to 300 rpm. to permit selection of the speed required.

Grinding wheels are 16″ maximum diameter with 10″ diameter hole and maximum width of 4″. They are mounted in separate wheel mounts with four adjustable balance weights.

Regulating wheels are 9″ maximum diameter with 4″ diameter hole and maximum width of 4″. They mount directly on the end of the regulating wheel spindle; no wheel mount is required.

2. No. 1 Tool and Cutter Grinder is designed primarily for grinding and reconditioning miscellaneous small tools and cutters. It has a capacity of 8-in. swing and 15-in. between centers.

Like its companion machine, the larger No. 2, the new model has the cartridge type grinding wheel spindle mounting with a double row of special preloaded anti-friction bearings packed in grease for life-time lubrication. The cartridge type unit may be readily replaced after years of service, thus restoring new spindle performance into the machine in an interval of minutes.

A reversible ½ h.p. motor drive, built-in to the wheelhead, provides the desired direction of grinding wheel rotation; spindle speeds (6260 or 3730 rpm) are obtainable from a tooth grip drive belt and sheave arrangement.
3. Also to be shown: Plain and Universal Grinders; Automated Plain Grinders; Angular Wheel Head, Automated Piston Relief, Micro-Centric and

**Cincinnati No. 1 Tool and Cutter Grinder.**

Chucking, Surface Grinders; Cutter Sharpening Machines; Electro-discharge Machines.

4. Other Tools: Milling, Broaching, Die Sinking Machines; Process Machinery. • •

## Cleveland Visual Grind Optical Contour Grinder .....Booth 810

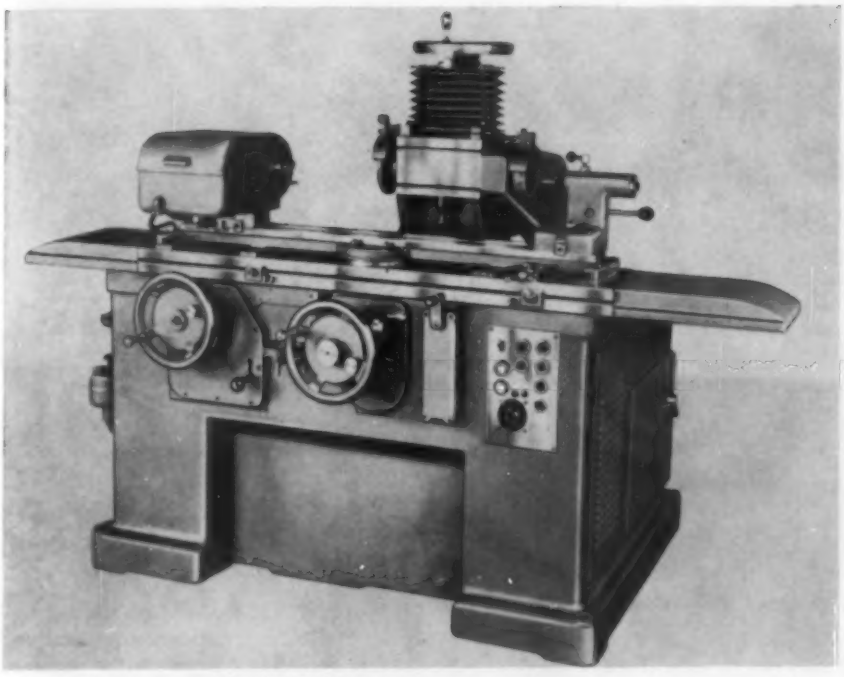
**Cleveland Grinding Machine Co., Cleveland, Ohio**

1. Machines have been developed to meet the demand for accurate surface form grinding in large and small tool room operations. When the machine is in operation a powerful light back of the piece being ground projects a shadow enlargement on a ground glass viewer. The shadow can be enlarged either 20 or 50 times, permitting the operator to actually see the work. On the viewer, .001 in. is stepped up to .050 in., almost a sixteenth of an inch.

## Bryant's Line of Internal Grinders . . . Booth 1015

**Bryant Chucking Grinder Co., Springfield, Vt.**

1. To be shown: 116-X Super Precision Internal Grinder; 1209-Y Automatic Hydraulic Internal Grinder; 3216 Automatic Hydraulic Internal Grinder; 1316-J Two-spindle Hydraulic Internal Grinder; 998 Precision Boring Machines; 2209-Y Automatic Mechanical Grinder combine with a Landis No. 4 Concentric Grinder.



No. 32 Universal and Tool Grinder.

No. 12-A Universal Cutter and Tool Grinder.

## Covel's Tool and Cutter Grinder and Universal and Tool Grinder .....Booth 720

**Covel Mfg. Co., Benton Harbor, Mich.**

1. No. 12A Universal Tool and Cutter Grinder has Pope tilting head with 1 hp. direct motor driven spindle. Quick action swivel and tilt clamps provided. Operating controls located at front as well as rear. Hardened and ground ball-bearing table ways.

No. 12-A can be adapted to cylindrical and internal grinding; wet attachment available. Precision ground thread crossfeed and elevating screws.

2. No. 32 Universal and Tool Grinder provides fine transverse and longitudinal feed for circular form tool work. Precision and carbide tipped Swiss type dial indicators are provided for reading the measurements. Infinitely variable eletronic speed control for table and headstock. 1½ hp. spindle motor drive through timing belt. Will swing work 12-in. x 30-in. between headstock and right hand tailstock.

Headstock speeds are infinitely variable from 50 to 400 rpm; standard spindle speed range 2900, 4200, 6000 rpm; cylindrical grinding spindle speed 1800 rpm. Table speeds are infinitely variable from 0 to 144-in. per minute.

3. Optical Comparators. 14-in. screen will give halo-free image. Cabinet is on casters and can be moved from place to place.

Working area is 13-in. x 6-in.; horizontal movement is 6-in.; vertical movement is 2½-in.

25 X lens furnished as standard equipment; 10X, 31.25X, 50X, 62.5X and 100X also available.

4. Also to be shown: Surface Grinders and Universal Tool and Cutter Grinders. • •

No. 14 Optical Comparator.

## Ex-Cell-O's Internal Thread Grinder, Tool Grinder Booth 1319

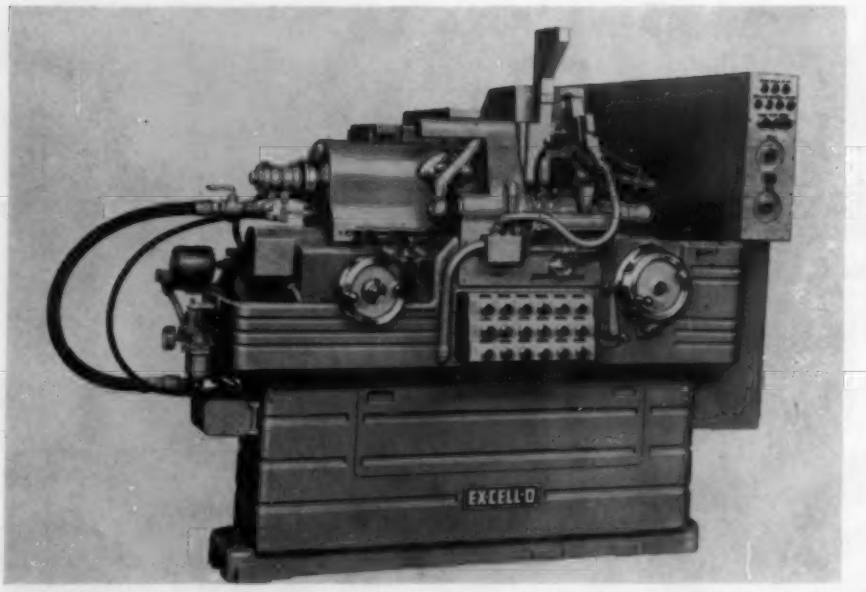
**Ex-Cell-O Corp., Detroit 32, Mich.**

1. Internal thread grinder with automatic work handling equipment, a standard Style 39-A, will be equipped to receive work from a conveyor, finish grind the thread automatically and eject the completed parts on to an endless belt for delivery to another conveyor.

The workpieces are ball race nuts used in steering gears, wherein anti-friction balls circulate between the nut and the screw. The thread form is first cut by an Ex-Cell-O Scru-Broach (also at the Show), and the parts are heat-treated prior to the thread grinding operation. The start of the thread must be held in relation to a keyslot in the outside diameter of the nut.

In operation a loading arm picks a part out of a loading chute, pivots down, thrusts the work into the chuck, rotates the part until a locating key drops into the keyslot, then the chuck jaws clamp and the arm retracts. The wheel slide comes forward and the work rotates and reciprocates in contact with the wheel. When the thread is ground to size the wheel retracts and the chuck releases and ejects the finished part.

2. Four models comprise the tool grinder line, which ranges from precision grinders with six-inch wheels to heavy-duty machines with 14-in. wheels. All are double-end models with




**Ex-Cell-O Internal Thread Grinder, style 39-A, equipped with automatic work handling equipment.**

reversible motors for proper wheel rotation for both left and right hand tools. The grinding is done on the faces of plate-mounted wheels, resulting in straight surfaces and accurate tool angles.

Tool rest tables are large enough to support tools firmly and are easily adjustable to the required tool angles. Tables are also adjustable toward the grinding wheels to compensate for wheel wear.

A precision tool grinder, the Style 44-A, is especially suitable for sharpening carbide tools with diamond wheels. The largest model of the line is the Style 49-A, a heavy-duty grinder for fast reconditioning of all tool materials.

**Ex-Cell-O precision Tool Grinder, style 44-A.**

Any practical combination of grinding wheels can be used on these grinders. For example, diamond wheels, or other finishing wheels can be mounted at both ends, or a silicon carbide or aluminum oxide wheel may be mounted at one end and a diamond wheel at the other end. Some shops prefer to use separate grinders for the roughing and finishing operations, specifying Style 48-B or 49-A for roughing operations, and 44-A or 46-D for finishing.

• •

## Gear Grinding's High Production, Fully Automatic Gear Grinding Machine .....Booth 315

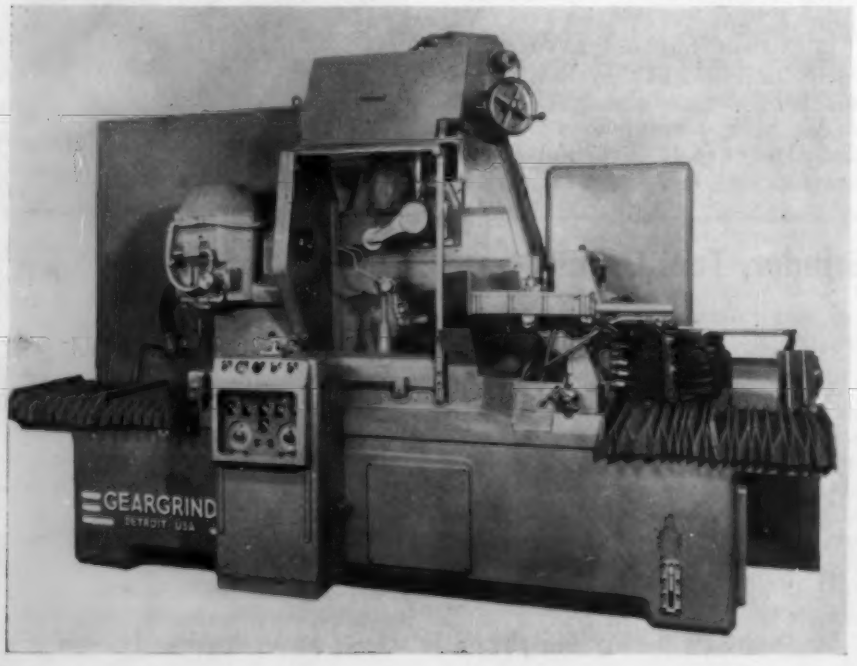
**The Gear Grinding Machine Co., Detroit, Mich.**

1. The GG-10X24FA fully automatic gear grinding machine features single or double diamond trimmers to assure a perfect blend between the tooth profile and the root fillet.

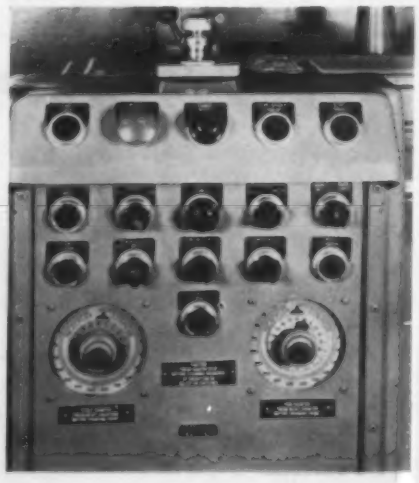
Coolant through the grinding wheel supplies a controlled flow of cooling and lubricating fluid to the working area between the grinding wheel and the gear tooth. This feature, coupled with the automatic feed, virtually eliminates the causes of surface tempering and checking during grinding.

2. The SG-10X24FAL Spline Grinding Machine is a high production flute or spline form grinder. The machine

**Fully automatic Gear Grinding Machine is especially suited for high production needs.**




**The machine master control panel features a transparent cover which prevents the operator from accidentally changing the adjustment.**



is fully automatic. Automatic loading is possible.

Stock equalizer automatically locates work relative to grinding wheel to assure minimum stock removal. Automatic rejection of defective work pieces; automatic trimming of the grinding wheel as well as automatic working cycle control are provided.

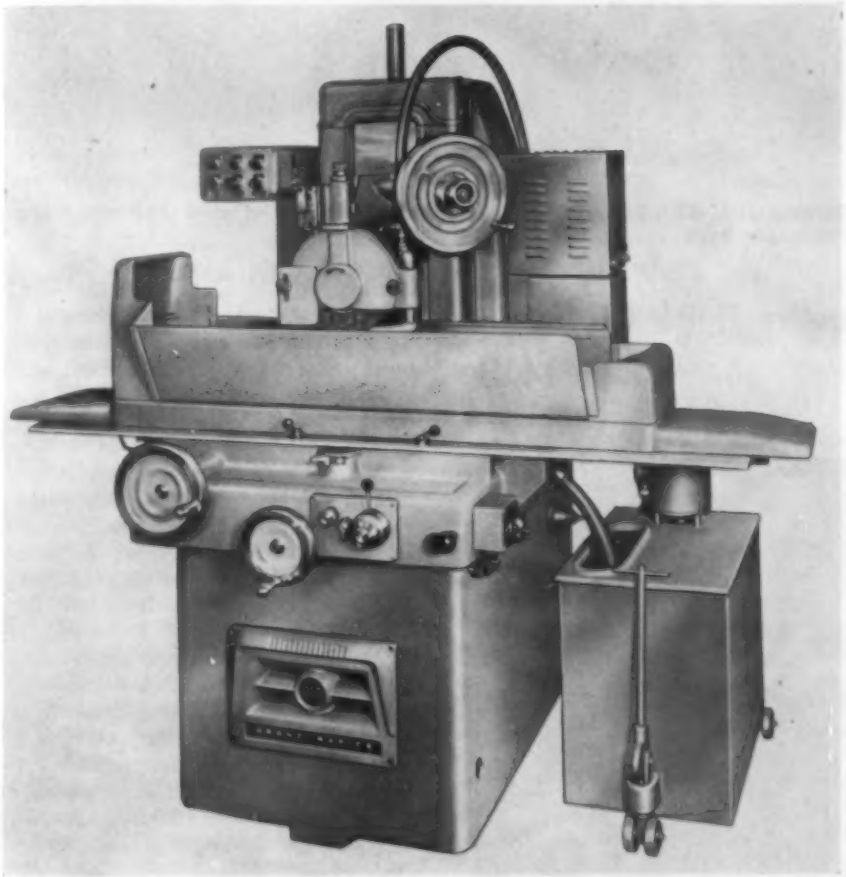
Other features: automatic down feed control permits the operator to pre-set stock removal per stroke and the total stock removal; automatic release of work pieces after grinding completes the automatic cycle; multi-wheel grinding increases the production rate by increasing the number of teeth being ground simultaneously; multiple fixed diamond trimmers are used to virtually eliminate grinding wheel dressing time; coolant through the grinding wheel provides free cutting wheels and permits higher stock removal rates; a clock is provided which accumulates the total machine cycle time for production control.

3. Also to be shown: Single Spindle Automatic Screw Machine Screwmatic 750. • •

## Gallmeyer & Livingston No. 350 Surface Grinder

### Booth 906

**Gallmeyer & Livingston Co., Grand Rapids, Mich.**



**Gallmeyer & Livingston No. 350 Hydraulic Feed Surface Grinder has an 8-in. x 24-in. working surface of table with capacity of 12-in. under full 10-in. dia. wheel.**

1. This new Hydraulic Feed Surface Grinder—No. 350 has 8 in. x 24 in. working surface of table with capacity of 12 in. under a full 10 in. diameter wheel.

It is built around a heavy, rugged, one-piece column and base for permanence of alignment between vertical headways and cross travel ways. Head of machine has precision grease-sealed ball bearing spindle carried on protected pre-loaded ball bearing ways for ease of vertical movement and extreme accuracy.

The inner race of the two ball bearing ways carrying the head consist of rods 2-7/16 in. dia., 40⅝ in. long, hardened to 70° Rockwell and accurately ground. The bronze ball retainer is carried on these ground shafts. Hardened and ground sleeves are pressed into the head so as to form the outer race. Exposed bearings are protected with bellows type guards.

Power rapid travel of wheel head available. (optional)

Vickers hydraulic pump and control valve of Gallmeyer & Livingston design and construction, provide an infinite number of longitudinal table speeds ranging from 3 inches to 125 feet per minute. Longitudinal table speed instantly variable. Hand wheel for operation of longitudinal table movement is also standard equipment and is automatically disengaged as the hydraulic feed becomes operative.

The hydraulic cross feed is variable up to a maximum of ⅜ in. per table reversal. The amount of cross feed may be quickly established.

The cross feed of the machine may be also operated by means of hand, which becomes automatically disengaged when the hydraulic cross feed is in operation.

A variable speed continuous cross feed for dressing or positioning is standard equipment.

The amount of longitudinal and transverse table movements is sufficient to permit clearing the entire working surface of the table with the standard 10 in. x ¾ in. x 3 in. grinding wheel.

The grinding wheel spindle is driven through vee-belts by a 2 hp. ball bearing motor.

The hydraulic mechanism is driven by a 1 hp. ball bearing motor housed within the base of the Grinder.

The machine may be equipped with a diamond dresser built into the grinding wheel guard.

2. Other new products: Surface Grinders; Hydraulic feed O.D. and I.D. Grinders; Plain Universal Cutter and Tool Grinder.

3. Also: Surface Grinders; Plain Cutter and Tool Grinder; Universal and Tool Grinder. • •

## Gorton Cutter Grinder

### Booth 1019

**George Gorton Machine Co., Racine, Wis.**

1. The popular and versatile 375-3 Gorton Universal Grinder will be demonstrated along with a completely new Gorton G-2 Plain or Universal Grinder which is a table model. In addition a complete assortment of small tools and accessories will be on display.

2. Also to be shown: Milling Machines; Pantographs; Duplicator Table; Swiss type Automatic Screw Machine.

## Gardner Double Disc Grinder for High Production Precision Grinding .....Booth 1115

**Gardner Machine Co., Beloit, Wis.**

1. Pump gear blanks will be parallel ground at the rate of 885 parts per hour on the new Gardner 2H30-30" double disc grinder tooled with automatic loading and unloading, rotary work carrier and automatic size control.

The parts measure 2.943 in. O.D. x 1.420 in. I.D. x .348/.350 in. thick. Stock removal from the blanks is .010 in. to .018 in. with tolerances of .0003 in.—.0005 in. for flatness and parallelism, and .001 in. for uniformity.

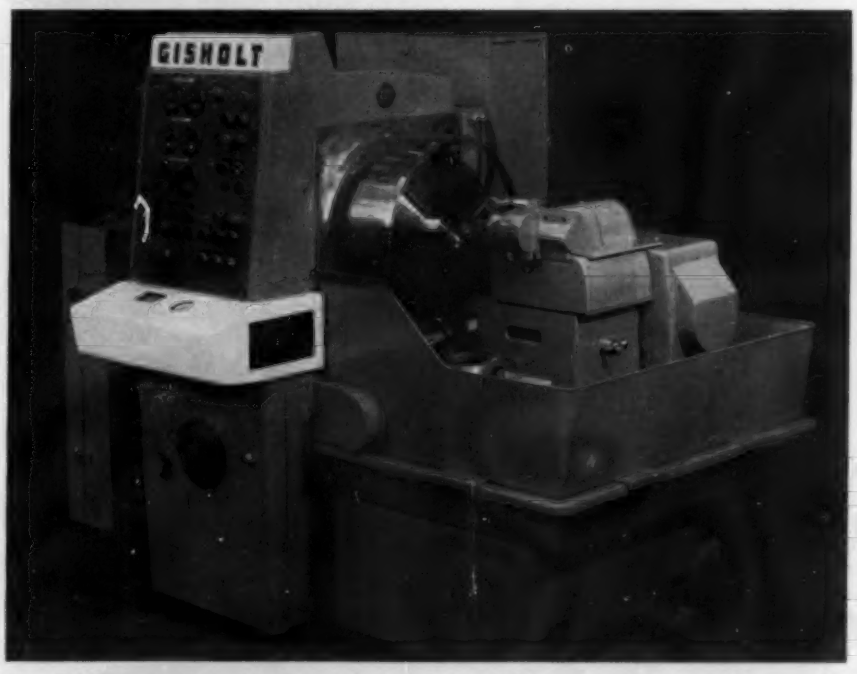
Workpieces will be loaded on this machine by a Feedall hopper feeder.

Parts are pneumatically transferred from the roll-chute to an 18-station rotary carrier which produces 594, 780 or 885 ground parts per hour, depending upon the speed setting on the carrier drive. Finished parts are discharged through a chute into a metal basket. • •

**Gardner 2H30-30" Double Disc Grinder which will parallel grind 885 pump gear blanks per hour.**

## Gisholt's Superfinishers for Quality Finish Control Booth 1413

**Gisholt Machine Co., Madison 10, Wis.**




**No. 79 Superfinishing Machine: Designed for wide variety inner and outer roller bearing races. Completely automatic cycle. Surface finished to 3-5 micro-inches in thirty seconds. 2½ tenths stock removed.**

1. No. 52A, General Purpose, has readily adjustable automatic cycle for job lot work. Demonstration on turret locking pins bring cylindrical surface finish down to 5 micro inches in less than .5 minutes floor to floor time.

2. No. 54 Two Spindle Machine will be set up on two different automotive transmission parts. Operator merely loads and unloads. Resultant finish eliminates any oil seal leakage due to excessive surface roughness. High production rate.

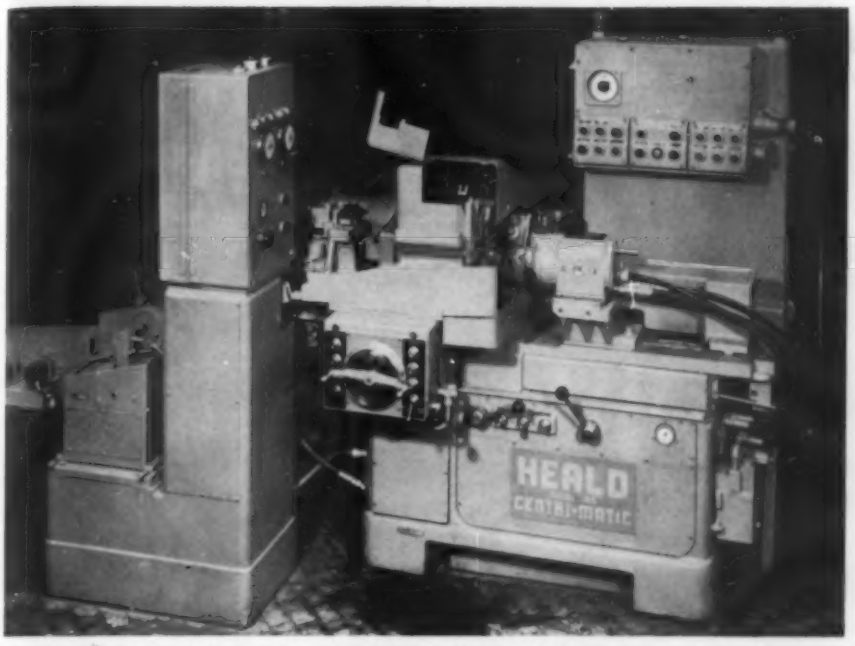
3. No. 79 Bearing Race Machine is a high production setup for inner and outer roller bearing races. Result is a better finish in less time. Single machine handles extremely wide variety of sizes and styles.

4. No. 81 Valve Tappet Machine is a new model, never before shown. Single spindle machine arranged with automatic cycle. Groups of these machines readily adaptable to varied production requirements, either with or without full automation.

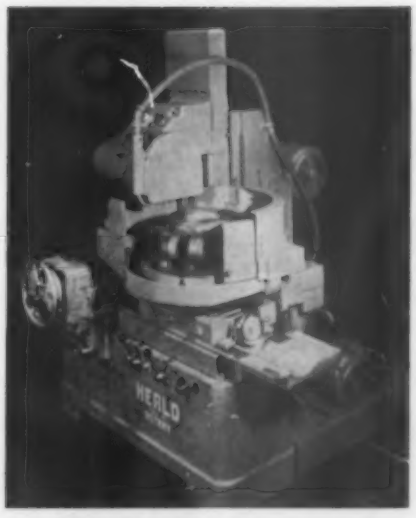
5. No. 3 Attachment is a display unit showing one of four sizes. Attachment ideal for occasional job. Mounts right on existing lathe in user's shop and saves cost of a special machine.

6. Also to be shown: turret lathes, automatic turret lathes; automatic production lathes, balancing machines. • •

**"Once business gets you to talking to yourself, it's time to go to a Show . . . . remember that!"**




**Model 190 Internal Grinder employs self-adjusting grinding cycles through a feedback system.**




**Model 361 Vertical Column Rotary Surface Grinder**

**Model 3 Tool Sharpening Machine.**

**Model 161 Vertical Column Rotary Surface Grinder**

## Heald Internal and Rotary Surface Grinders

## Booth 902

**The Heald Machine Co., Worcester 6, Mass.**

Three new and automatic high production Internal Grinding machines.

All three machines employ self-adjusting grinding cycles through a Feedback system. Wheel change at periodic intervals is the only attention these machines require for which the machines shut down automatically and flash attention lights.

1. Model 190 Centri-Matic Bore Grinder is particularly well-adapted to anti-friction bearing inner races. Parts located and rotated on the ball track using hard shoes, eliminating the necessity of grinding the lands on many applications. Rotation is by frictional engagement with a rotating backing plate. A new rotary diamond with self-compensating cycle eliminates diamond adjustments and maintains a uniform wheel dress at all times. Other new features include air gaging, sorting and feed back. The air gaging inspection and sorting is accomplished automatically in the unloading chute from which point the Feedback system is originated. Should a predetermined number of pieces run outside tolerances the machine shuts down.

2. Model 1901 Centri-Matic Ball Track Internal Grinder is in production finishing the ball tracks on No. 3203 outer races with a self-adjusting Size-Matic cycle. Air gaging is employed in the unloading chute which feeds back intelligence to the radius dresser compensating for trends toward the high and low points within size tolerances. Skip dressing and compensation is featured on this machine.

3. Model 170 Automatic Chucking Internal Grinding Machine is an end loading automatic chucking machine employing Feedback to a Size-Matic cycle. Hopper feed with automatic orientation of the part is employed. Feedback to a new rotary diamond is initiated by air gaging in the unloading chute which also sorts parts should an outsize bore be found.

4. Model 3 Precision Tool Sharpening machine has direct reading scales for easy setting of angles and tool point radius. Both round and square tools are accommodated. Swing of the tool holder is 150° included angle.

Gear box completely enclosed in an oil tight case.

A free hand grinding attachment can be applied to the machine for extra large, flat or odd-shaped tools. Using a coarse wheel, tools may be roughed out on this attachment prior to precision finish grinding, with the standard machine arrangement.

5. Model 161 Vertical Column Rotary Surface Grinder is furnished with manual or mechanical type power table reciprocation and is ideally suited to the general run of small surface grinding work as well as to finishing saws, slitters, gear cutters, matched angular contact bearings and similar work. It has a 10 in. vertical capacity from top of chuck to center of grinding wheel and the chuck can be swiveled 15° for convex or concave grinding. Grinding stroke is 4 in.; swing inside the chuck guard is 12½ in.

6. Model 361 24 in. chuck machine is quite similar in construction to the

smaller Model 161, but has the massive, rugged construction and power essential for big work or heavy stock removal where necessary prior to finishing. A double pump system on this hydraulic model ensures little heat generation, making for greater accuracy.

Model 361 is furnished with plain or automatic cycles, both types being equipped with power vertical feed and power vertical traverse for the wheelslide in addition to the hydraulic table drive. A sparkout attachment is available for the Automatic machine providing automatic control of sparkout time. Swing inside the chuck guard is 28 in. and vertical capacity is 17½ in. maximum from top of chuck to center of wheel. Convex swivel to 17° and concave to 10° is provided. • •

## Jones & Lamson's Complete Line of Grinders .....Booth 1111

**Jones & Lamson Machine Co., Springfield, Vt.**

1. Model E Form Grinder with antifriction slides for accurate control of work size. Automatic cycle with automatic loading, and unloading. Diamond dressed wheel for accuracy and finish.
2. Optical Contour Surface Grinder will grind a former from a template. The image of the grinding wheel follows the part outline on the comparator screen.
3. Model E Groove Grinder with automatic loading and unloading. Groove diameters are controlled by crush dressing OD of grinding wheels. Groove width and spacing controlled by cemented diamond particle rolls, dressing wheel sides.
4. Tap Grinder with automatic loading and unloading. Lead is obtained by lead screw for each pitch and hand. Tap size capacity—6⅜ in. dia.
5. 6x36 in. Thread Grinder with continuous wheel dressing by cemented diamond particle rolls, maintains a free cutting and correct grinding wheel form at all times. Very high rate of stock removal.
6. 12x45 in. Thread Grinder with Automatic Wheel Crushing Device. High rate of stock removal with a multi-ribbed wheel. Grinding a 5 pitch Acme thread on a 7 in. dia. blank.
7. New 14 in. Screen Optical Comparators are designed and built to precise machine tool standards for extreme rigidity. Work tables are guided on either ball bearings or scraped ways. Angle measurements are read direct to the exact minute. Projection illumination approaches the ideal point source of light for sharp, high contrast shadow images.

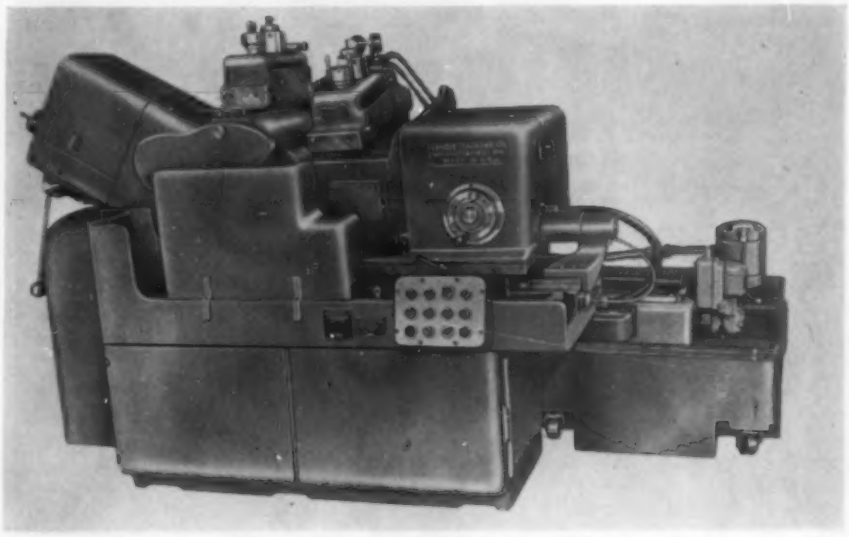
All lens systems (10X, 20X, 31.25X, 50X, 62.5X, 100X) have 6½" focal length providing generous clearance in the staging area. Lenses, factory matched and prefocused may be mounted singly, or in a six-position turret, located inside the machine, for quick selection. 10° Screen angle offers extreme ease in the use of overlay charts, as well as comfortable viewing. Shadow images are erect at all magnifications.

Two reflection attachments are available: One provides an acute angle light source at each side of the projection lens for oblique illumination. The light can be converged from a 1½" to ¼" area. The other allows reflection inspection of deep holes, shoulders, and polished surfaces.

Also to be shown: Turret Lathes; Automatic Lathes; Automatic Turret Lathes. • •

## No. 1 Landis Centerless Thread Grinder.....Booth 1406

**Landis Machine Co., Waynesboro, Pa.**



**Landis Machine's No. 1 Centerless Thread Grinder uses either the infeed or thrufeed method.**

The No. 1 Landis Centerless Thread Grinder is designed for threading operations requiring extreme accuracy, high production and excellent thread finish.

The thrufeed method of centerless thread grinding is used for workpieces requiring threads on the maximum diameter only and where there are no interfering shoulders to prevent the workpieces from passing through the throat formed by the grinding wheel, the regulating wheel and the work support blade. The thrufeed method of grinding is performed by passing the work through the machine in a continuous stream. Normally the workpieces are hopper fed to enable completely automatic operation. Representative rates of production are given in following examples ¼ in. x ¼ in. —20 pitch headless set screws are threaded at a rate of 7,500 per hour and 1 in. diameter, 88 pitch continuously threaded studs are ground at the rate of 480 linear inches per hour.

The infeed method of grinding is used for workpieces having heads or shoulders, double end studs, parts having one or more diameters larger than the diameter to be threaded, and parts requiring threads that must be concentric with another portion of the piece with close tolerances.

The No. 1 features a standard 1/16 in. to 2 in. diametrical range for both infeed and thrufeed grinding. By the use of a special workrest blade it can also thread workpieces from 2 in. to 4¾ in. in diameter. Maximum thread length for thrufeed grinding is unlimited while 5¾ in. is the maximum for infeed work. • •

**Floor model FC-14 Comparator has electronic variable speed vertical measuring control.**

## Landis' Centerless, Automated Universal, Grinders .....Booth 1117

**Landis Tool Co., Waynesboro, Pa.**

1. Four diameters on automotive universal joint spiders are finish ground on the new Landis No. 12 Centerless grinder with special automation features.

Machine is equipped with an automatic hydraulically operated work loader with magazine type feed and indexing unit for turning the work pieces. Multiple wheels are mounted on the grinding wheel spindle and also on the regulating wheel spindle for this operation.

The average rate of production is 240 work pieces per hour. Stock removal from each of the four diameters is .010 in. to .012 in., and the tolerances are held within .001 in.

The work piece is brought into the automatic loading mechanism through an overhead magazine, and is then carried to the grinding position by loading arms. Two passes of the loading arms constitute the completion of one cycle. Two diameters of the spider are ground on the initial pass.

2. A low cost, general purpose precision cylindrical grinder, Landis Grindwell, is useful for manufacturing, maintenance, tool room and training purposes.

Special features of the machine include speedy setups, flexible operation, precision tolerances and fine finishes.

A smooth operating headstock houses an all vee-belt drive and only two revolving parts. Headstock speeds are adjusted by rheostat in infinite range of 85 to 483 rpm for instant selection of best work speed. It is a fully universal headstock with reversible rotation.

The Grindwell is a small machine requiring little floor space. It has both a live and dead spindle headstock, a two speed hand traverse and four speed power traverse. The headstock, wheel head and work table all swivel.

3. Work pieces up to 6 in. diameter can be ground on a sustained high production basis on the improved No. 12 Centerless grinder.

Key to the accuracy and fine finishes obtained on the grinder is the weight of the machine. The bed, for example, is a one-piece iron casting having a tensile strength of 50,000 psi.

Both the grinding and regulating wheel heads can be moved on the No. 12 centerless. The work rest is mounted on the bed casting itself, providing still further rigidity.

Regulating wheel speed can be changed instantly at the twist of a dial on the front of the grinder. The speed is infinitely variable between 12 and 100 rpm, and can be changed at any time.

Loaders or conveyors do not have to be realigned when the wheels wear down. These conditions are met simply by moving the grinding wheel or regulating wheel heads toward or away from the work. The work rest and

**Grindwell Universal Grinder.**

associated mechanisms remain in a fixed position.

4. Valves for internal combustion engines can be automatically ground at extremely high rates of production on a battery of different type valve grinding machines hooked up in series. This includes grinding the stem, face and length.

A demonstration of this automated production line will be made by Landis Tool Company and Gardner Machine Co.

Two Landis grinders and one Gardner disc grinder will be combined to grind the valve stem, tapered valve seat and the length of the valve stem. The process will incorporate automatic loading and unloading, automatic grinding cycles, and automatic transfer devices.

5. One or more diameters and an adjoining face or shoulder can be ground in one operation on the new Type K 10 in. Plain Cylindrical grinder with a 30° Angle Wheel Head.

The wheel head slides on precision vee and flat ways which are permanently positioned at 30 degrees from the normal perpendicular setting. This arrangement permits both shoulder grinding and normal cylindrical grinding on parts at the same time. When required, multiple diameters plus shoulders can be ground simultaneously.

A newly designed hydraulic infeed mechanism provides automatic rapid positioning of the wheel head and a slow grinding-feed stroke which can be adjusted from zero to .200" on diameter of work. A feed rate valve controls adjustment of the feed rate, and an anti-backlash device insures extra close accuracy.

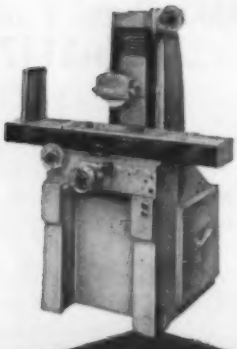
6. High production and extremely close precision are obtained in the grinding of multiple diameters on the new No. 12½ Centerless grinder with special automation features.

The grinder will grind three diameters on an armature shaft at the rate of 250 pieces per hour. The diameters will be finish ground to a tolerance within .0003 in. Stock removal in the operation will be .003 in.

Key to the high production rate is

(Continued on page 32)

**No. 12 Centerless Grinder.**

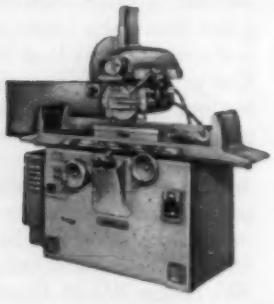


**TYPE D**
**HAND FEED SURFACE GRINDER**

***Completely anti-friction design and permanently lubricated. Available with interchangeable vertical and horizontal spindle attachments.***

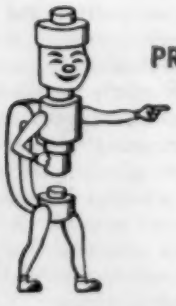
*from the new hand feed baby*

**TYPE 2F**
**HYDRAULIC SURFACE GRINDER**



***Tool room and production grinder with new coolant application both through the wheel and externally.***

# Thompson



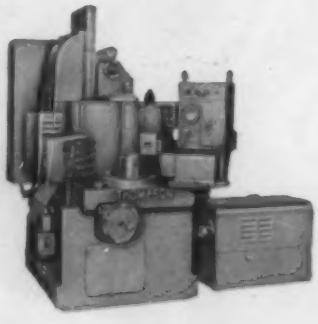
**PRECISION PETE SAYS:**

***"Everybody knows Thompson Grinders are the very highest quality . . . but in addition you'll find that they cost no more than many other grinders . . . Buy Thompson for quality and price!"***

**BOOTH NUMBER**
**1407**

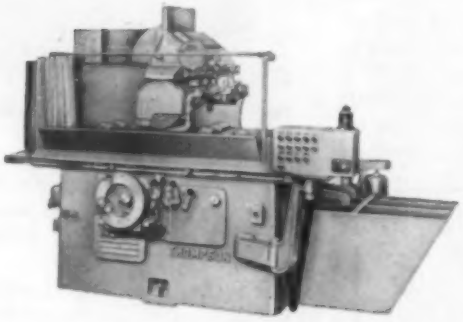
**6" TWIN ROTARY GRINDER . . .**

***with automatic control and automatic gauging.***



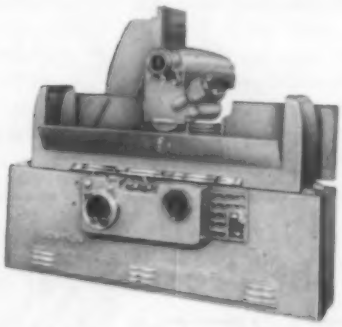
MODEL B TRUFORM GRINDER . . .

*the latest 12" x 20" contour grinding machine with automatic crushing and truing cycle.*



TYPE G
HYDRAULIC SURFACE GRINDER . . .

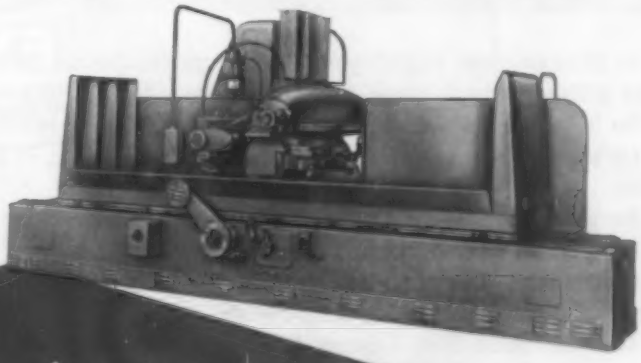
*a deluxe surface grinder in 12" x 16" x 36" size range.*



*. . . invites you to see the newest developments in Surface Grinders.*

TYPE CX
DOUBLE HEAD WAY GRINDER

*way grinder, 36" x 36" x 120", with both horizontal and vertical heads.*



*. . . to the two headed giant*

*Call, write or wire today*

**Thompson Grinders**

THE THOMPSON GRINDER COMPANY • SPRINGFIELD, OHIO

Encircle No. 208 on card, opposite Page 72

(Continued from page 29)

the tooling for automatic operation of the machine; the grinder is equipped with an automatic work loader and unloader. The grinding cycle is completely automatic from start to finish.

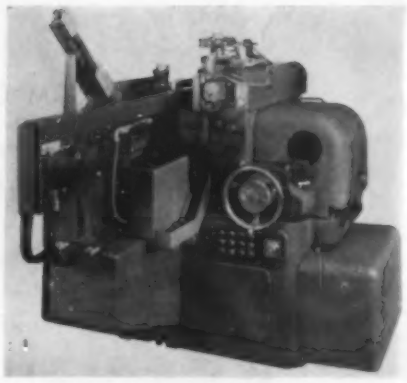
The loading device removes the work piece from the loading hopper, places it on the work rest between the grinding wheel and the regulating wheel, and deposits the part in a container when the work cycle is completed. The loader tilts up slightly to lower the work pieces between the profile dressed wheels.

An automatic timing device hooked up with the automatic wheel head feed controls the cycle time, controlling both the spark-out and round-out. An air gage will be used in the demonstration to check the accuracy of the finished parts.

7. Automatic loading, grinding and unloading increases grinding of line bearings of crankshafts on the 16″x40″ Type H-IW Multiple Wheel Hydraulic grinder.

Multiple diameters can be ground simultaneously, and at much higher production rates now that the work is loaded and unloaded automatically.

The machine in the Landis booth grinds five main bearings and the oil seal diameter of a V-8 crankshaft in one operation. The production rate is 32 shafts per hour, and stock removal is .020 in. to .025 in. from each diameter.



**No. 12 Centerless Spider Grinder with special fixturing.**

The multiple wheels and the automatic handling of the work assures a closer degree of accuracy and concentricity in the finished pieces. Worker fatigue is severely reduced, if not eliminated entirely.

Each shaft is placed in position for grinding and, at the completion of the grinding cycle, carried to the opposite end of the machine and unloaded. The loader has two sets of loading and unloading fingers. The unit moves by hydraulic power across a rail type transfer fixture.

8. A built-in gaging device which works like a brain and fully automated handling permit high production of bearing races on the 4″ Concentric grinder.

Inner bearing races will be ground at the rate of 250 per hour to a tolerance of .0005 in. on diameter. Stock removal from the parts will be .016 in.

Special automated features on the machine include automatic work loading and unloading devices; a hydraulically operated automatic wheel dresser; a counter on the dresser to control dressing intervals; a dress pass counter for the number of diamond passes over the wheel; compensating feed to the feed hand wheel, special hand wheel feed mechanisms and controls to accommodate feed back signals from a brain-like quality control gaging device.

9. In the grinding demonstration at the Landis Booth, this machine, 5″ Type-DH Semi-Automatic Hydraulic Cam grinder, removes from .006 in. to .010 in. of stock from V-8 camshafts at the rate of 13 shafts per hour.

Exclusive feature of the grinder is the automatic slowdown for finishing, and automatic stopping of the head at loading position. Maximum swing over the cradle is 5 in., and maximum wheel width 1¾ in.

The model cam is made from tool steel with the aid of highly specialized


**the right dresser for**

# EVERY WHEEL

Only Desmond can furnish you with the correct dresser for each type grinding wheel. Some are shown above, left to right:

**For large coarse wheels**—the Desmond Heavy Duty, in two sizes.

**For abrasive belts and drums**—the Desmond Beltbrasive, in three sizes.

**For general utility**—the Desmond Huntington, in three sizes.

**For precision work**—Desmond diamond hand tools.

**For fine work**—Desmond Ball Bearing Precision, which does the work of diamonds in many applications.

**Also**—Desmond Hex, Desmond Rearwin, Desmond Sherman, Desmond Diamo-Carbo, Desmond diamond nibs for all makes of grinders, Desmond Crackerjack—and special dressers and cutters for unusual applications.

Write for new Desmond Dresser Catalog, and name of your nearest Industrial Distributor.

THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

**Desmond**

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

Encircle No. 209 on card, opposite Page 72

# An Outstanding Advance

## in PLUNGE FORM GRINDING

*This advertisement was run in May this year.*

Sets New Records for Production and Accuracy . . . Reduces Costs . . . Replaces Other Methods for Producing a Great Variety of Work! Note These Advanced, In-Built Features!

- **Completely automatic cycle** — High speed approach, wheel feed spark out and withdrawal are positively controlled through simple cam action — ensuring constant, uniform operation under all conditions.
- **Automatic positive size control** — The wheel slide is held against positive stops with uniform hydraulic pressure.
- **Automatic trueing device** with controlled dressing.
- **Automatic or manual handling.**
- **Complete versatility** — chucking work, center work or shoe-type grinding; crush wheel or diamond trueing.
- **Compact design** — affords exceptional accessibility and simple set-ups.

J & L says: **"You ain't seen nothin' yet"**

*Machine Tool Craftsmen Since 1835*

JONES & LAMSON MACHINE TOOL DIV.

JONES & LAMSON MACHINE CO., 531 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

Now come to Booth No. 1111 (Chicago Machine Tool Show) and see these even more advanced grinding techniques.

## Here's what you'll see—

*Model E*—ball race—auto. loading and unloading —wheel head slide control to .0001"

*Model E*—grooves—Cemented-Diamond-Particle dressing rolls—auto. loading and unloading

*Tap Grinder*—0" to ⅝" diameter—wide range of work speeds—auto. cycle—auto. loading and unloading

6 x 36—steering worms—faster than milling—continuous dressing—no dressing cycle

12 x 45—5 pitch Acme thread on 7" blank—in 1½ to 2 revolutions

*Contour Surface Grinder*—duplicate grinding from master template—hydraulic

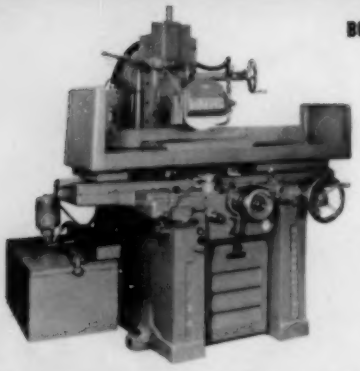
*Optical Contour Grinder*—image of wheel follows outline of part on built-in Comparator screen

Encircle No. 273 on card, opposite Page 72

*Look for* **CARBORUNDUM®** *at the Machine Tool Show*

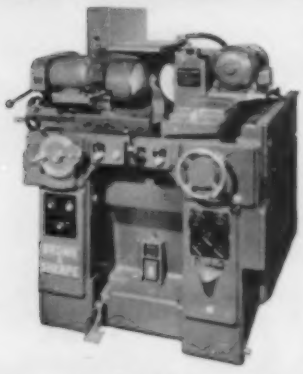
# ...ON THE LEADING

BOOTH NO. 317



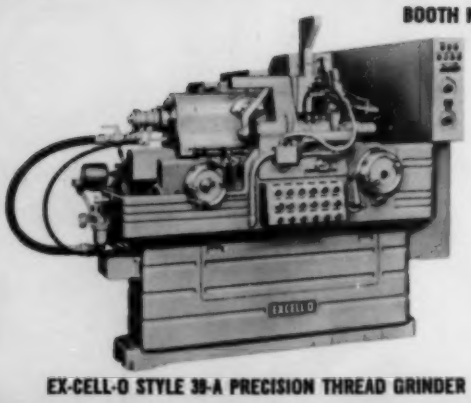
ABRASIVE MACHINE TOOL CO. NO. 1224 HYDRABRASIVE SURFACE GRINDER

BOOTH NO. 528



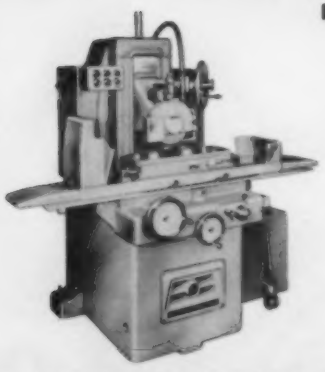
BROWN & SHARPE NO. 11 FACE GRINDING MACHINE

BOOTH NO. 1319



EX-CELL-O STYLE 39-A PRECISION THREAD GRINDER

BOOTH NO. 906

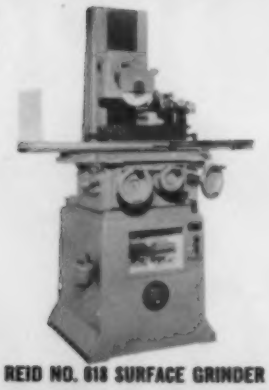


GALLMEYER & LIVINGSTON NO. 350 SURFACE GRINDER

BOOTH NO. 604

OLIVER AUTOMATIC FACE MILL GRINDER

BOOTH NO. 108



REID NO. 618 SURFACE GRINDER

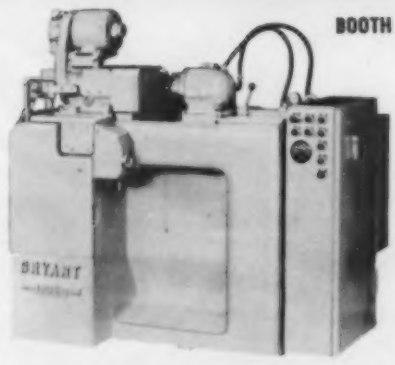
**THE NEWEST DEVELOPMENTS** in grinding machines will be on display at the Machine Tool Builders Show in Chicago. See them all—and notice how many models of these modern machines are equipped with CARBORUNDUM Brand Grinding Wheels.

**THE MACHINE BUILDERS' DECISION** to use Wheels by CARBORUNDUM on their show machines is your most positive assurance that the brand name CARBORUNDUM means precision ... higher production ... lower cost per unit machined. For engineering helps on *your* specific grinding problems, ask your CARBORUNDUM Distributor or salesman.

➡ Look for other **LEADING GRINDING MACHINES** featured in **CARBORUNDUM'S** advertising in STE

# GRINDING MACHINES

BOOTH NO. 1015

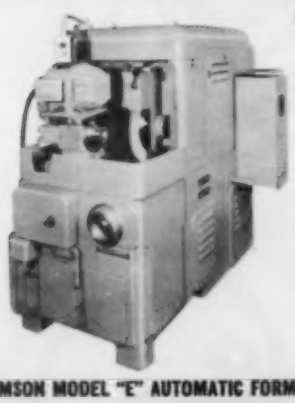



BRYANT NO. 1209 INTERNAL GRINDER

BOOTH NO. 1112

COLONIAL NO. CS-5-36 UNIVERSAL BROACH SHARPENER

BOOTH NO. 1111

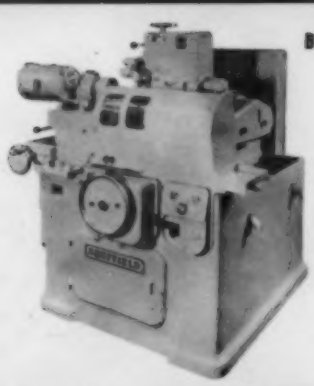


JONES & LAMSON MODEL "E" AUTOMATIC FORM GRINDER

BOOTH NO. 1117

LANDIS NO. 12 CENTERLESS GRINDER

BOOTH NO. 1305



SHEFFIELD MODEL 189 PRECISION ANNULAR FORM GRINDER

BOOTH NO. 805

VAN NORMAN DIVERSIMATIC NO. 1-C CENTERLESS GRINDER

01-512

# CARBORUNDUM

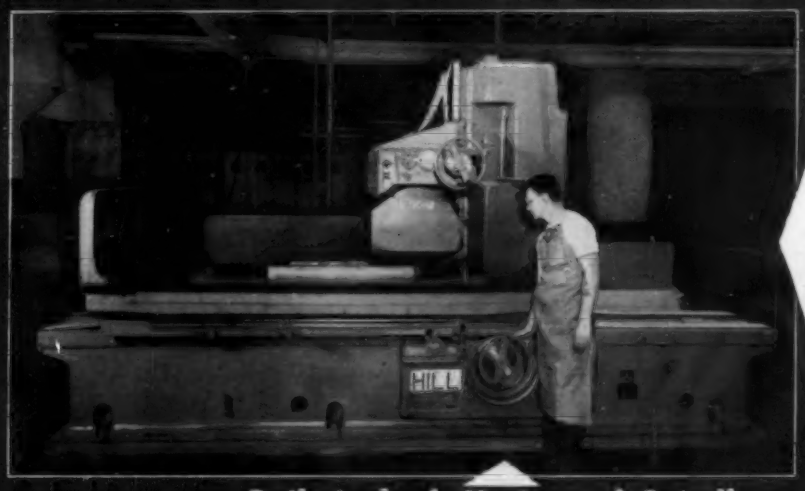
REGISTERED TRADE MARK

*...continually putting more* **SENSE** *in your abrasive* **DOLLAR**

**STEEL,** Aug. 29, and in **METAL WORKING,** Sept.... still others in **IRON AGE,** Aug. 25 and in **MACHINERY,** Sept.

# What HILL GRINDERS Have Done for Others They Will Do for YOU!

- *Produce a smoother finish and closer tolerances.*
- *Increases man-hour production.*
- *Actual case histories prove definite worthwhile dollar savings over other methods*



Use the "Hill" Horizontal Spindle Grinder for a wide range of grinding — flats, angles, irregular and special shaped surfaces — ideal for maintaining close tolerances with low micro inch finish. Made in table widths of 18", 24", 30" and 36" — table lengths from 5 to 20 feet.

- **Built in both Horizontal Spindle and Vertical Spindle types.**
- **Choose the most efficient type for YOUR requirements.**

Use the "Hill" Vertical Spindle Grinder for rapid stock removal and accurate grinding of flat surfaces — recommended for accuracy, speed and finish — features that mean increased precision production. Made in table widths of 18", 24" and 30" — table lengths from 5 to 20 feet.

HILL ACME TOOLS OF INDUSTRY

## THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

Encircle No. 274 on card, opposite Page 72

(Continued from Page 32)

equipment. The master cam for the grinder is then ground on precision equipment and tested for accuracy.

Feed of the diamond wheel dresser and the grinding wheel are interconnected so that wheel diameter reduction, due to dressing, is compensated for by wheel feed. All wheel head ways are lubricated automatically. The headstock drive is 100% vee belt, using no universal joints or swinging idlers.

10. Small tools and parts for the aircraft and instrument industries are ground at low cost on the 10″x20″ Type H Universal grinding machine equipped with a swinging internal grinding fixture.

The unit will accurately grind all kinds of precision tool room work, as well as many small parts, on a high production basis. Its versatility includes straight grinding, shoulder grinding, taper grinding, face grinding and internal grinding.

11. A versatile grinder for the production tool room, the 12″x28″ Universal and Tool grinder can be equipped with 22 different attachments. It makes possible faster production on small grinding jobs, quick changeover from one setup to another, and exceptional surface tolerances for a small machine.

This machine can be used for both universal cylindrical grinding and sharpening cutting tools.

Standard equipment permits the following grinding operations: cylindrical grinding, taper grinding, surface grinding, tooth grinding, face grinding and spiral mill grinding.

12. Any number of diameters can be ground simultaneously on the 10″ Type H-IW multiple wheel hydraulic grinding machine with precision accuracy. A great variety of parts with multiple diameters can be ground to a straight or profiled finish on the unit.

The 10″ Type H-IW not only does the work of several conventional cylindrical grinders, but also eliminates extra grinding operations, reduces work handling time and saves floor space. Work quality is improved because all diameters ground simultaneously are concentric.

This machine, at the Landis booth, is grinding five line bearing diameters of a V-8 camshaft in a single operation. The bearings are ground to a precision finish. This type of grinder is used extensively in automotive production lines.

13. Grinding cycles are easily and quickly changed to handle a wide range of small work pieces on the 4″ Type H Plain Hydraulic grinder. Adjustable electrical and hydraulic controls make it easy to select the right combination of speeds and feeds for maximum output. Once set, the grinding cycle is completely automatic.

Three different diameters of a stub shaft are ground in one operation at a production rate of 300 per hour. Stock removal from each diameter is .002 in. to an extremely close tolerance. An overhead profile hydraulic dresser is used to dress the wheel.

14. An entirely new universal cylindrical grinder will be known as the 12″ x 36″ Type K Universal.

The machine is of exceptionally rigid and compact design, having ample wall thickness and weight in all components. Operating controls are all conveniently located on the front of the machine where they can be easily seen and reached.

Infinitely variable speeds from 60 to 360 rpm are provided in the new headstock which is controlled from a dial on the front of the machine. Conversion from live spindle to dead spindle is accomplished by a special plunger and locking screw combination.

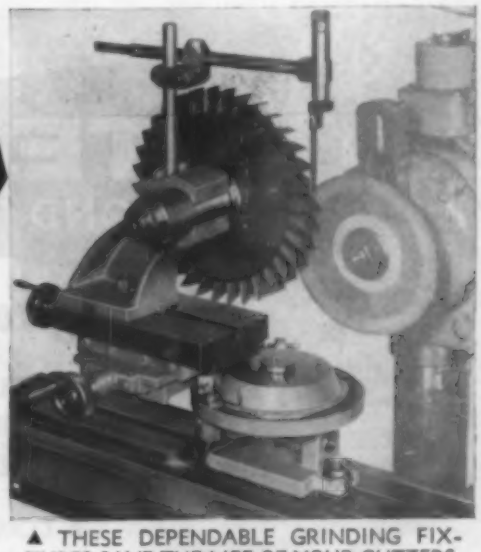
15. Two new and improved semi-automatic plain cylindrical grinders have been designated as 6″x18″ Type K and 10″x36″ Type K.

Maximum rigidity is obtained from a one-piece box section bed casting of generous wall thickness. Spaced leveling screws assure proper level and alignment. • •


THE UNIVERSAL RADIAL CUTTER GRINDING FIXTURE

**Does 5 Operations without removing cutter from its ARBOR!**

On cutters up to 8″ in diameter, the No. 6 fixture, as shown with our No. 6A heavy-duty, right-angle, ballbearing spindle workhead:
Sharpens side teeth on **both** sides.
Sharpens peripheral teeth.
Generates small or large radii on **both** corners of each tooth.
(Other workheads available)



▲ THESE DEPENDABLE GRINDING FIXTURES SAVE THE LIFE OF YOUR CUTTERS. Write for our catalog 602

◀ UNIT 1A
This Universal Cutter Grinding Fixture fits any universal tool or surface grinder.

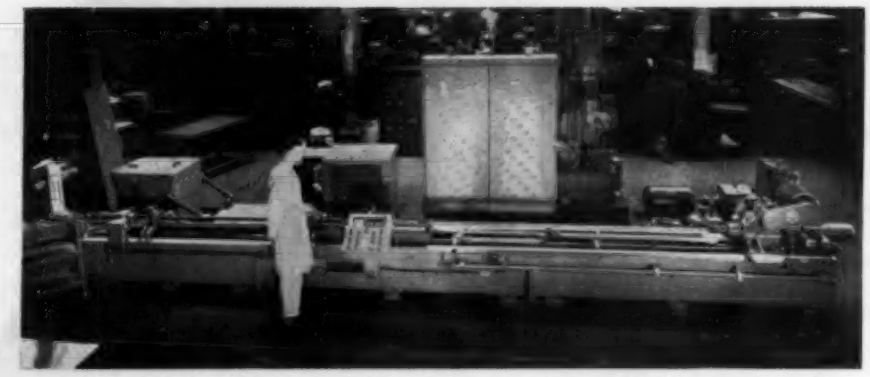
▲ UNIT 4A
Radial Grinding Fixture for sharpening fluted end mills with square, conical, or ball-nose mills. The index disc provides for multi-flute cutters.

Radial Grinding Attachment D combines with Unit 1A for sharpening end mills with square, conical, or ball nose shapes. ▼

▲ NEW FINE-ADJUSTMENT SLIDING SWIVEL GIVES SMOOTH, PRECISE INDICATOR SETTING. Smooth, positive positioning of finest dial indicator is readily accomplished by the fine-adjustment Sliding Swivel. Final precise positioning is accurately made by slight movement of convenient lever "A".
WRITE FOR:
SLIDING SWIVEL FOLDER

**ROCHELEAU TOOL & DIE CO.**
650 North Main St., Leominster 1, Mass.

Encircle No. 210 on card, opposite Page 72



**Model 6110 horizontal machine with Roto-Cone tool, Power-Feed automatic expansion, Microsize control and Altern-Grip fixture, all interlocked.**

## Micromatic Hone Shows Honing Applications

**Booth 1211**

Micromatic Hone Corp., Detroit, Mich.

1. Generating accurate size, geometry and surface finish in long, thin wall tubing. These tubes, 8′ 2″ long, are directly from the mill. Removing .008 in. to .010 in. stock from the diameter, they are made straight and round within .0005 in. tolerance. Model 6110 horizontal machine with Roto-Cone tool, Power-Feed automatic expansion, Microsize control and Altern-Grip fixture, all interlocked to give maximum accuracy and production, and simplicity of operation.

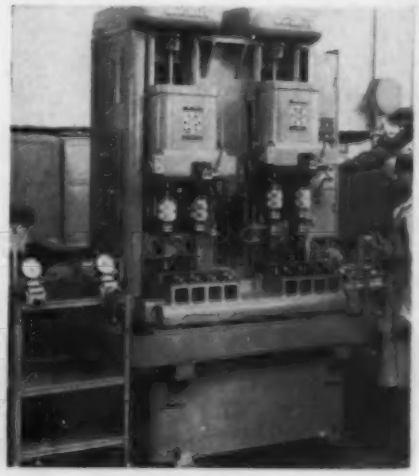
2. Production-finishing of flat sealing surfaces on aluminum die-cast part. These parts must have a flat surface with a controlled finish so they will form a tight seal when bolted together without a gasket. Production is 1200 parts per hour. Model 844 Microflat machine with a 20-station work-holding fixture. The abrasive and fixture rotate continuously, with the operator unloading and reloading parts as they move past him.

3. New method of processing pinion gears to give longer life and quieter operation, with increased production and less scrap, the gear blanks are first put through a new automatic Model 836-2 Microflat machine. This is a Paral-Flat operation, generating the two end faces of the gear parallel and flat, thus establishing control surfaces for subsequent processing. Production from this machine is 1200 gear blanks per hour.

This completely automated machine has automatic loading, "feedback" to compensate for abrasive wear . . . controlled by an air gage that checks the thickness of each part; there is also automatic ejection and gaging for parallelism. Dressing of both abrasives simultaneously, without dismantling the machine. Machine is an automatic Model 738-C Microhoner.

This machine produces 120 parts per hour, removing approximately .004″ stock from each diameter. Size is held

**Four-spindle Model 710-4 Hydrohoner is used with a lateral, eight-station, two-position indexing table. The wrist-pin bore is honed by two spindles and the crank-pin bore by the other two. The eight-station fixture permits the operator to load four stations while rods are being Microhoned in the other four.**



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to less than .0003" tolerance, and taper and out-of-roundness less than .0001". 4. Generating functional surface finish and accuracy on external spherical surface. The cross-hatch lay pattern (characteristic of Microhoning) and the controlled surface character duplicated on every surface make possible the carrying of heavy loads without pick-up or galling. The operation is performed on a new Model 757 machine.

5. Production generating of final accuracy in wrist-pin and crank-pin bores of automotive connecting rods. Diametric size, roundness, straightness and a functional surface finish are all obtained in one operation. A four-spindle Model 710-4 Hydrohoner is used with a lateral, eight-station, two-position indexing table. The wrist-pin bore is Microhoned by two spindles and the crank-pin bore by the other two. The eight-station fixture permits the operator to load four stations while rods are being honed in the other four.

Production is 400 rods per hour while removing .002 in. to .003 in. stock from each rod. Tolerance is held to .0003 in. for diameter size, roundness and straightness.

6. Generating functional accuracy and surface finish on helical spline surfaces of hardened gears. Distortion resulting from heat treating is corrected; final diametric size, geometry and a characterized surface finish duplicated on all load-bearing surfaces. Model 728 machine equipped with automatic indexing fixture, Microsize and Microdial. 30 per hour, removing .004 in. stock to correct out-of-roundness.

**Generating functional accuracy and surface finish on helical spline surfaces of hardened gears using Model 728 machine equipped with automatic indexing fixture, Microsize and Microdial.**

7. Honing precision external cylindrical surfaces. This operation generates a truly round, accurately-sized surface to any degree of smoothness that is specified. Model 731 Microhoner with special external Microhoning tool. This equipment is the first ever designed exclusively for high precision external surfaces. It is small, easy to set up and operate.

8. General-purpose Microhoning machines designed for the shop having a variety of parts and range of sizes. These machines are demonstrated with latest type Microsize control and automatic feed. However, they may be easily adapted to manual control and simplified table and fixturing. Model 425 Hydrohoner has the power and speed range to remove stock rapidly and efficiently from all types of bores from 4 in. to 8 in. in diameter.

It has a 25-inch stroke with an overall height of 124 in., making it conveniently serviceable in shops that have a limited head clearance.

Model 715 Hydrohoner. For smaller diameter precision parts. This machine generates extremely close tolerances and removes stock at a rapid rate.

9. New Micromatic Multi-Diameter tool. This one tool will cover a range of bore diameters from 8 in. to 24 in. Its rugged design permits it to remove stock from the hardest material.

10. Special Hydrobrake head may be adapted for use on any type machine.

• •


5520

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**START the process now which leads to grinder replacement, but remember . . . THERE IS ONE BEST GRINDER FOR YOU, and you can choose it with speed and certainty from among the 160 separate sizes and designs which comprise the U.S. line. 58 years of experience in grinder design and construction is your assurance of plus-values in every feature.**

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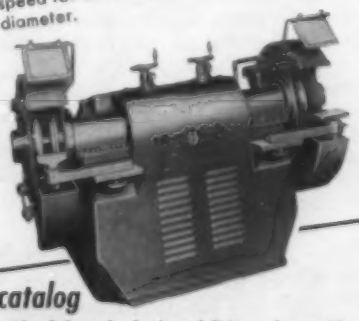
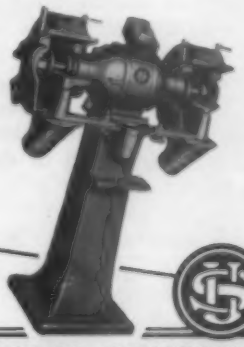


*or . . .*

Take a quick look at the Model 500 Utility Floor Grinder. Totally enclosed motor (1 to 5 H.P.). Push button starting with overload protection. Ball bearings enclosed in dust tight housings. Enclosed adjustable wheel guards. Tool tray and lift-out water pot.



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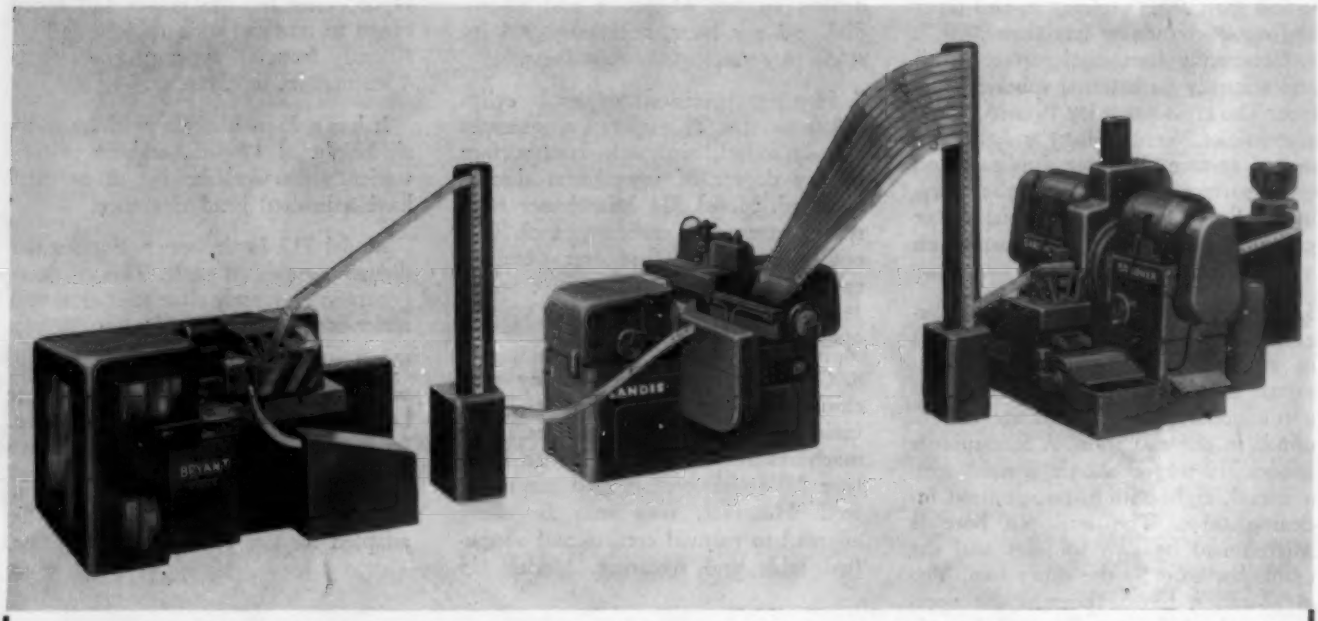



**Automated production line for high grinding output of ball bearing outer rings. Machine at right, starting point, is a 2H-30 Gardner Double Spindle Precision Disc Grinder. In the center is a Landis No. 12½ Centerless; at the left a Bryant 2209-G Automatic Internal grinder made by Bryant Chucking Grinder Co., Springfield, Vt.**

# Three Different Grinder Builders Cooperate In Automated Ball Race Production Line

• IN WHAT is believed to be an unprecedented move in the machine tool industry, three manufacturers have tied in an automated line three different type grinding machines to demonstrate production of ball bearing outer races at the Machine Tool Show.

The combination, designed to perform various grinding operations, is correlated by means of automatic transfer equipment. The entire setup will be seen in operation at the Show.

Cooperating in the joint venture are Landis Tool Company, Waynesboro, Pa., Gardner Machine Company, Beloit, Wis., and Bryant Chucking Grinder Company, Springfield, Vt.

To start the three-way cycle, work pieces are placed in a vibrating type hopper and transferred automatically to the loading mechanism of the first machine in the line, the new Gardner 2H30-26" Precision Horizontal Double Disc grinder.

Using the through-feed method of grinding, the parallel sides of the rings can be ground to size automatically at the rate of 6,000 per hour.

Stock removal is .006 in. to .008 in., with .0001" for flatness, .0002 in. for parallelism, and .0005 in. for uniformity.

Loading, sizing and transfer of the parts is done automatically. Sizing control is maintained automatically by a Sheffield Plunjet and Gaging Anvil Lectrolair Control.

After the sides are ground, the parts are automatically unloaded into the transfer mechanism for delivery to the second machine, the Landis No. 12½ Centerless grinder.

The Landis grinder employs a new and unusual method of loading and grinding in this operation known as stack grinding. Parts are delivered and the outside diameters are ground in multiples of 10 parts per loading cycle. This is done by automatic receiving and stacking of the work parts in the loading device before they are loaded between the grinding wheel and regulating wheel of the machine.

While this method provides for the simultaneous grinding of multiple parts, it also guarantees more accuracy than previous grinding methods.

A built-in automatic feeding mechanism controls diameter size by feeding the grinding wheel head into the work. The rate of feed is pre-set by adjusting the feed rate valve.

An automatic dressing cycle can be set to dress the grinding wheel after any pre-determined number of loading cycles. Used with this cycle is a compensating device which automatically feeds the wheel head in the amount required to compensate for reduction of wheel size by dressing.

When the parts are ejected from the Landis centerless grinder, they pass automatically through a Sheffield air gage which permits quick and easy control of quality. At this point, the parts are again picked up by the transfer mechanism and conveyed to the last grinder in the line, the Bryant 2209-G Automatic Internal Grinder.

The Bryant grinder is equipped with a shoe centerless fixture and a magnetic work driver with an automatic radial diamond holder. This holder arrangement permits dressing the correct shape on the grinding wheel for grinding the internal ball race.

Grinding of the race diameter is controlled by diamond sizing. To speed production, the machine is cycled to dress only at intervals . . . not for each work part, as is done normally. The machine cycle can be altered to dress the wheel at any desired number of pieces by simply turning the dial located on the machine control panel.

A post gage, combined with a feed compensating mechanism in the machine, keeps the work part size within the required tolerances. After internal grinding, this gage measures each raceway diameter. The resulting information is analyzed to determine the trend of size variation.

If the trend is of sufficient importance, a signal is sent to the feed compensating mechanism in the machine. Over-size and under-size parts are thus rejected by the gage.

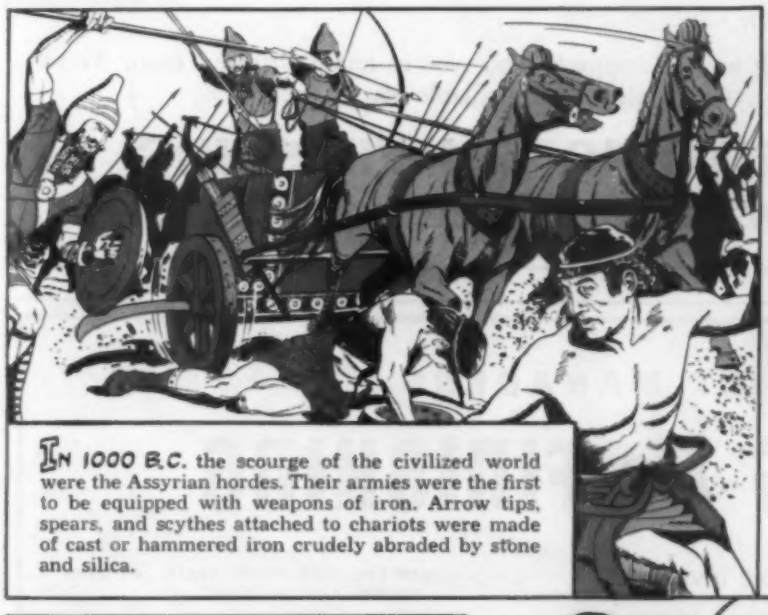
• •

NO. 3 OF A SERIES
ON THE HISTORY OF ABRASIVES
BY CHICAGO WHEEL & MFG. CO.

# DISCOVERY of IRON...
## changes world picture...and advances the use of abrasives.

At the time Egypt was flourishing, a new civilization was evolving in an adjacent section of the globe. From around 2000 to 400 B.C. the power of the world shifted to Asia Minor with the empires of the Babylonians, Assyrians, and Persians. Here, civilization grew up and developed, and the wonder metal of the age, iron, came into general use.

ANCIENT HITTITES discovered iron about 1300 B.C. in what is now Armenia, and began distributing it throughout the Near East. Iron daggers abraded to a smooth finish were the first implements made of the new metal. Perhaps the first instance of iron being mentioned in connection with weapons was a gift of a dagger from the Hittite King Hattusil to his son-in-law, Ramesis II of Egypt.



IN 1000 B.C. the scourge of the civilized world were the Assyrian hordes. Their armies were the first to be equipped with weapons of iron. Arrow tips, spears, and scythes attached to chariots were made of cast or hammered iron crudely abraded by stone and silica.

THE FABLED CITY of Babylon had many masters, but under the Chaldean Emperor Nebuchadnezzar it reached its greatest heights. Abrasion played an important part in finishing and shaping the metal implements of the time; and among the items listed as part of a dowry for a Babylonian maiden were "two grinding stones."

WITH THE ADVENT OF IRON, Middle Eastern armorers working in copper and bronze found that the abrasives they had been using didn't perform properly on the harder metal. A better abrasive material was required, and this eventually appeared when emery was imported from the Greek Isle of Naxos.

**The polishing and finishing of iron implements is a simple matter today. Over 200 different types of grinding wheels and other abrasive products are available from Chicago Wheel for use on all metals including the grinding of the harder, high temperature alloys. If you have a finishing or grinding problem, let us help you solve it.**

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**Manufacturers of abrasives, precision grinding wheels and mounted points for over 65 years.**

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# ONE OF CHICAGO'S TOP PRODUCTION EXECUTIVES SOON TO BE AVAILABLE

The editors of Grinding and Finishing have known this man for many years and we can honestly say there are few production executives topping him in production know-how. He has been vice president in charge of production, works manager, and factory manager. He has an enviable record of reducing costs and upping production, having laid out plants and organized the flow of production from design to finished product.

He has had wide experience in large plants specializing in the mass production of close tolerance products; has traveled widely in procuring machine tools and equipment and has done outstanding work with tooling standard machines for high production jobs.

He is accustomed to labor relations and has an excellent record of compatibility with labor and the unions, never having been involved in a strike or threat of strike whenever he was in authority.

Aside from the purely administrative executive level he has first hand knowledge of setting up, scheduling, estimating, and seeing that things get done. He can point with pride to having increased profits for those with whom he's been associated.

Age: 46, married, American. Prefers the Chicago area.

The editors of Grinding and Finishing will be happy to place you in touch with this man. You'll agree, when you speak with him, that his type of talent isn't available often.

**Write: Editor, GRINDING and FINISHING**
**222 East Willow Ave., Wheaton, Illinois**



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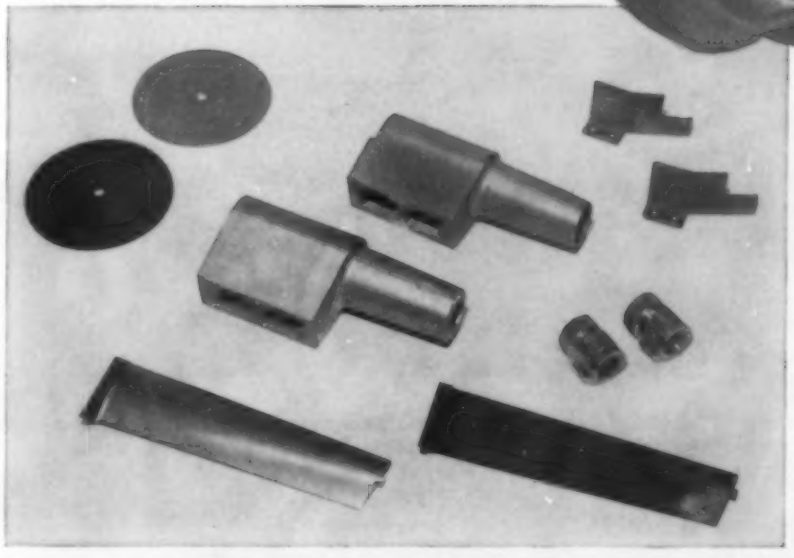
# EXOLON Tumbling Abrasive



Various stamped, die cast, forged and screw machine parts before and after barrel finishing with EXOLON abrasives.

• More and more manufacturers are turning to barrel finishing for its big savings and uniformity over individual hand finishing.

Naturally, the process is only as effective as the abrasive used. In response to the demand for a fast-cutting, long-life abrasive, EXOLON has developed this super-hard aluminum oxide grain which is *barrel-finished itself* for non-scratch, precision smoothing of your metal surfaces.

May we barrel-finish some of your sample parts *at no obligation to you?* Or, if you prefer, we are prepared to furnish you trial lots of Exolon Barrel Finishing Abrasive at quantity discount for trial in your own barrel. You will find, as others are finding daily, that it gives you a superior finish at substantially lower cost. Write today!

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Manufacturers of SILICON CARBIDE and ALUMINUM OXIDE ABRASIVES

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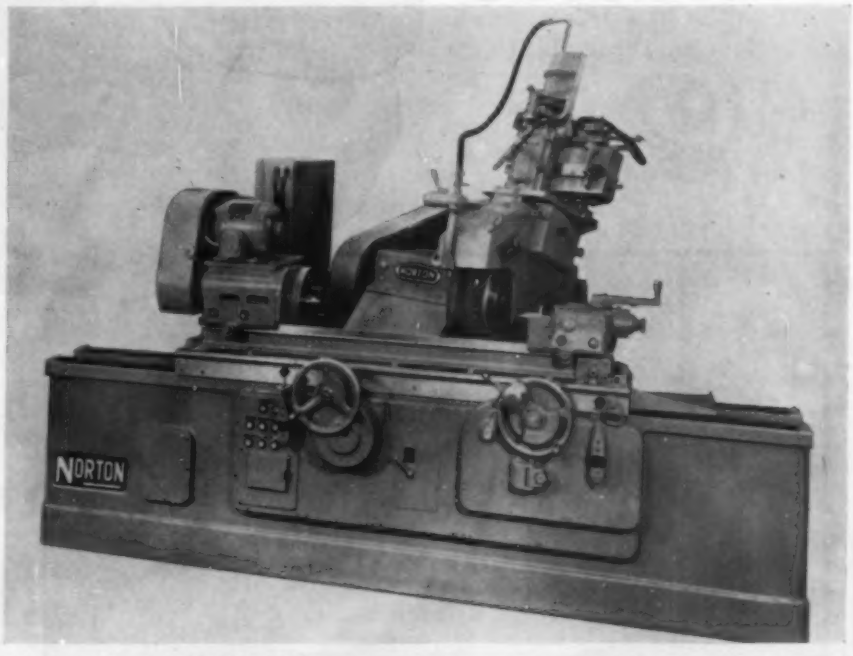
# Norton To Unveil Five New Machines.....Booth 516

**Norton Co., Worcester, Mass.**

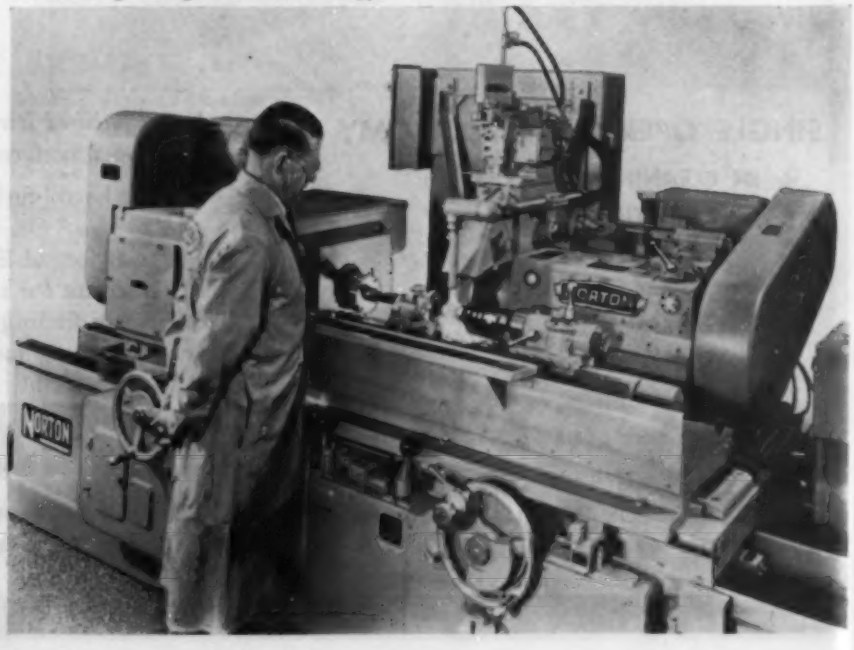
1. The Transfer Type Crankpin Grinder, has been installed in two American plants and in one European plant. Visitors will see a two station crankpin grinder built especially for the show. This will be a completely operating unit built up on one base section instead of the normal two in order to conserve space at the show.
2. The No. 3 CAM-O-MATIC Automatic Cam Contour Grinding Machine has been designed for faster grinding of automotive type camshafts with better finish. The machine has simpler and sturdier construction details than earlier models. The use of a Gilmer timing belt produces a positive work drive with resulting smoother work rotation since slippage is eliminated. Better cam contours result.
3. The Multi-Wheel grinder is designed to grind multiple diameters on a single shaft. Thus it makes a fine working partner for the Transfer Type Crankpin Grinder as it is ideally suited to grinding the mains of the crankshaft before the pins are ground.
4. The Universal Grinding Machine, Type U-4, is a completely new universal grinder. It provides extra versatility through simplified set-ups and fast, precise grinding action for limited production items. The principle new feature is the swiveling headstock which has a dog drive plate on one end and a 5 in. D-1 cam lock nose on the other end for mounting chucks or fixtures. A work speed range of 40 to 400 rpm. in an infinite number of increments is available at the touch of a dial. No direct current is required since the headstock drive is controlled through rectifiers.
5. The Angular Wheel Slide Grinding Machine replaces the widely used Norton Type C Angular machine. Faster sizing qualities and simplified operation are features. The operator can true the wheel at the touch of a button in far less time than would be required for manual truing and no operator skill is necessary. Heavier construction has been incorporated in many of the mechanisms to provide better finish with faster grinding.
6. The Type CTU Cylindrical Grinder is available with a wide variety of standard or specially built equipment. Wheel guard truing is available on these machines. This machine is the latest model in a long line of cylindrical grinders. The Grinding Machine Division was established originally to manufacture the first heavy duty cylindrical grinder in 1900.
7. The No. 48 Hyprolap High Production Lapping Machine is available for either single or parallel face flat lapping operations in the following arrangements: Plain, Timed Cycle; Automatic Continuous Feed; Semi-automatic Continuous Feed.

The plain, timed cycle arrangement uses an electric timer to control the machine cycle. The operator merely removes finished parts, inserts rough

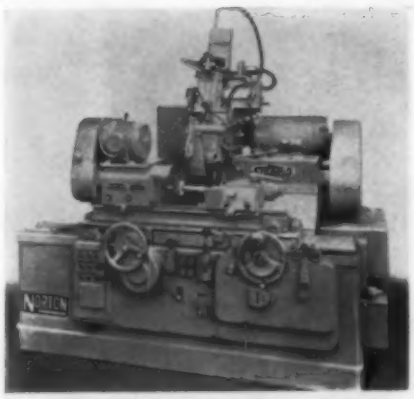
**The Angular Wheel Slide Grinder features faster sizing qualities and simplified operation.**




**Norton's No. 3 CAM-O-MATIC Automatic Cam Contour Grinder has been designed for faster grinding of automotive type crankshafts with better finish.**




**Universal Grinder, type U-4, provides extra versatility through simplified set-ups and fast, precise grinding action for limited production runs.**



**The CTU Cylindrical Grinder is available with a wide variety of standard or specially built equipment.**

parts and then presses a push button to start the cycle which is terminated automatically by the timer. With the semiautomatic continuous feed arrangement, the operator removes finished parts and replaces them with new parts as the lapping is done continuously in a single pass between the laps. The automatic continuous feed arrangement eliminates the loading and unloading functions of the operator and places them in automatic handling equipment.

For single face lapping the machine mounts a single 48″ diameter bonded abrasive wheel lap on a rigidly supported, heavy duty, vertical spindle. Work pieces are retained in suitable adaptors and a proper lapping pressure secured through weights or pressure devices as required. Truth of the lap face is generated and maintained by a rugged, column mounted diamond truing arm, operated hydraulically.

Opposed parallel flat faces can be lapped in this machine simultaneously. For this operation a massive column and overarm arrangement is provided to support the upper 48″ diameter lap. Work pieces are held in retainers between the two laps. • •

## Moore-Fosdick Automatic Positioning Jig Grinder

**Booth 1402**

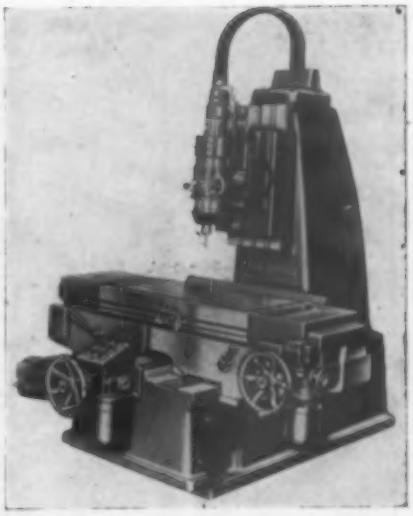
**The Fosdick Machine Tool Co., Cincinnati, Ohio.**

1. The Moore-Fosdick Automatic Positioning Jig Grinder, combines the unique Moore jig grinding head with the exclusive Fosdick automatic positioning table. This makes it possible to obtain greater capacity for precision grinding with the speed and convenience of a table that automatically positions work to ±.0001-in.

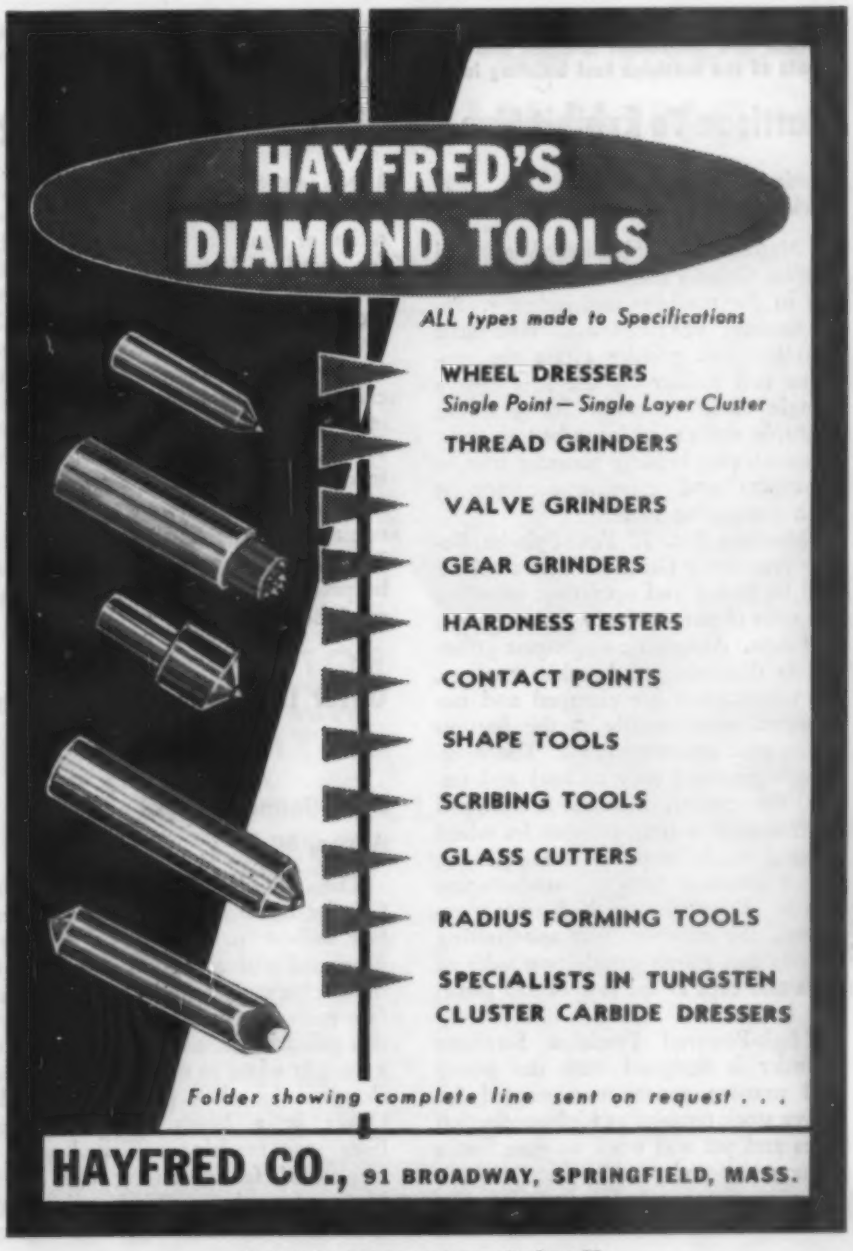
A special feature of the machine is its ability to grind cylindrical and tapered holes. It will grind cylindrical as well as conical holes, with taper in either direction. An angular and indexing device built into the main spindle, and newly developed slot grinding attachment, permit the quick, accurate grinding of any contour—regular or irregular. Infinite range of grinding speeds—from 12,000 to 60,000 rpm.

With the automatic positioning system, measurements are very simply made by setting dimensions from the blueprint on direct-reading drum dials, one for longitudinal, the other for transverse position. Easily-read numerical dials are claimed to minimize errors. Class 'A' gages, permanently sealed against dust and never handled by the operator, provide consistent precision. Accuracy guaranteed to .0001-in.

2. Also on display: Jig Borer with Automatic Positioning; Radial Drills; Sensitive Drills. • •



**Moore-Fosdick Automatic Positioning Jig Grinder grinds cylindrical and tapered holes.**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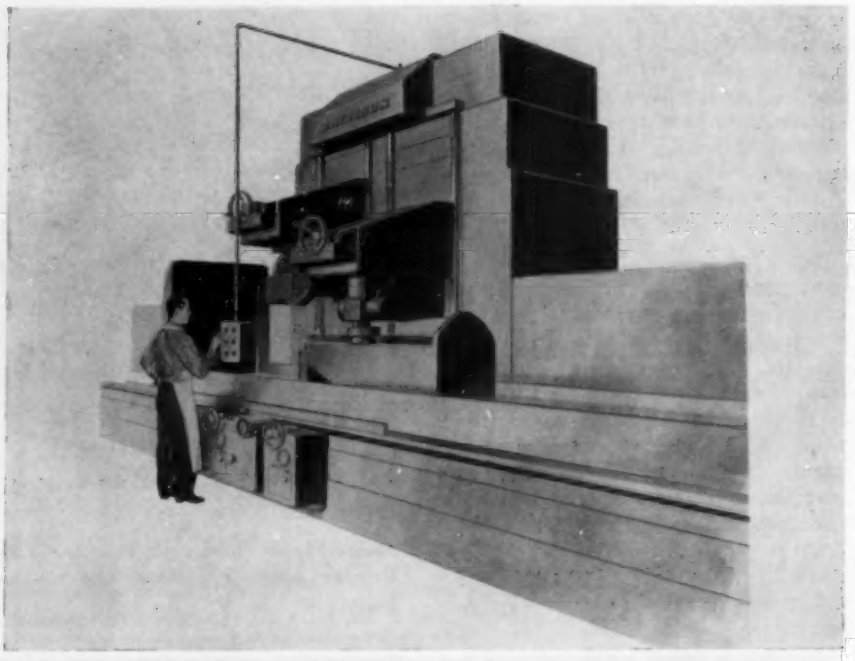
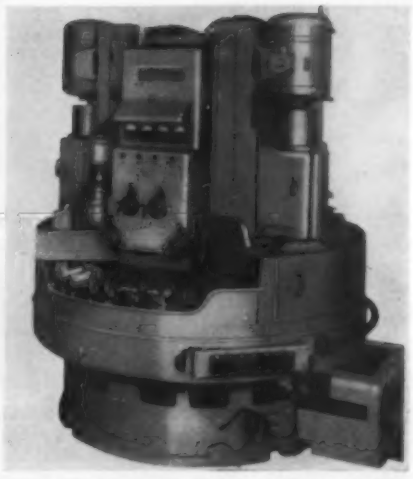


**The Mattison Combination Way and Surface Grinder, equipped with independent vertical and horizontal spindles and specially developed for the production requirements of the machine tool building industry.**



**The Mattison No. 72 Four-Spindle Rotary Automatic Grinder demonstrates automatic single-pass grinding.**

**The Mattison No. 400SS Vertical Spindle Surface Grinder is a machine capable of holding a tolerance .001 in. over the entire length of 123 in. shear blades. These welded high-speed steel shear blades are ground accurately at a high production rate with a fine finish.**

## Mattison To Exhibit Five Machines ..... Booth 1422

**Mattison Machine Works,**
**Rockford, Ill.**

1. Mattison Combination Way and Surface Grinder has been developed for use in the machine tool industry. Incorporating vertical and horizontal spindles, this grinder offers the machine tool builder for the first time a "single-setup" method for grinding multiple surfaces of large bed castings, columns, etc., holding accurate relative alignment and extreme accuracy at high production rates.
2. Mattison No. 72 Four-Spindle Rotary Automatic Grinder. This machine will be tooled and operating, grinding the sides of automotive connecting rods and caps. Automatic single-pass grinding is demonstrated by this machine, on which parts are clamped and unclamped automatically as the fixtures rotate past actuating cams. The operator is required only to load and unload the grinder. Machine is equipped with automatic compensation for wheel wear through the use of sizing gauges, which maintain parts to manufacturing limits. Powered for high stock removal, the machine uses self-dressing wheels and rough grinds two sides of rods and caps at the rate of 375 pieces per hour.
3. High-Powered Precision Surface Grinder is designed with the power and massive construction needed for heavy stock removal at high-production rates and yet will work to close limits of accuracy and produce excellent finishes. It is useful for fast, accurate machining of flat or contour surfaces.
4. No. 400SS Vertical Spindle Surface Grinder specially adapted to the generation of accurate, flat surfaces, usually for grinding flat sides of knife and shear blades, surfacing machine parts, die blocks, gear racks, or small tools.
5. No. 4 Vertical Rotary Surface Grinder with automatic cycling, a machine for toolroom grinding, die grinding, general production, and manufacturing operations. All functions of this machine are controlled electrically from a push-button panel making it easy to operate, even by less-skilled workmen. Precision work at close tolerances can be produced in steady volume on this machine. • •

## Oliver to Introduce Hand Operated Face Mill Cutter Grinder

### Booth 604

**Oliver Instrument Co.,**
**Adrian, Mich.**

The Hand Operated Face Mill Grinder has a capacity for sharpening face mills 4 in. to 24 in. in diameter. Equipped with a cup wheel in order to more efficiently grind the close pitch face mills now being used in industry, this grinder eliminates the difficulty of a straight wheel in obtaining the proper clearance for close pitch cutters. The Oliver is a heavy, well-constructed floor type machine equipped with a face plate for mounting the cutter. Mounted on heavy Timken bearings, the face plate will swivel 360 degrees. The grinding unit consists of a ram which operates in a heavy bearing and moves on a hardened track with balls for easy travel. The grinding wheel spindle can be tilted either side of center up to 90 degrees and locked in position. A diamond, located beneath the grinding wheel, provides a fixed grinding position which eliminates error due to wheel wear. The spindle is driven by vee belts and a 1 hp motor.
2. Oliver Drill Point Thinner is for thinning webs of twist drills. Capacity 5/16 in. to 3 in. with improvements in the grinding unit, the wheel dressing fixture, etc. This machine is com-

**Oliver Hand Operated Face Mill Cutter Grinder.**

pletely universal, and many reasonable types of thinning can be accomplished on it.

3. A hand operated Bench Type Drill Pointer No. 21 is used for drills 3/32 in. to ½ in. in diameter.

4. The No. 510 Pedestal Drill Pointer sharpens twist drills ¼ in. to 3 in. in diameter, 2-3-4 flutes, and provides the Oliver Drill Point with the proper amount of clearance to assure maximum drilling efficiency. Semi-automatic operation—one setting required—the drill revolves continuously during the grinding operation. Equipped with anti-friction bearing to provide long life, this machine is driven by a 1 hp motor.

4. The No. 2 Arc Radius Grinder is a hand operated machine for sharpening face mills and similar cutters with a radius. The radius may be varied from 0 to 2 in. This machine is cam-controlled and grinds the face, periphery and the radius in one pass of the grinding wheel. Driven by a ¾ hp motor, the No. 2 ARC uses a cup wheel and is very efficient on the type of work for which it is recommended.

5. The Hydraulic-Automatic Face Mill Grinder is used for sharpening high speed and tungsten-carbide face mills automatically. It automatically indexes and grinds the cutter to a pre-determined form. This machine is cam-controlled and grinds cutters to a tolerance of .0002 in. A new feature is the hydraulic feed to the work spindle which provides a fully automatic grinder.

6. Universal Tool and Cutter Grinder is used for sharpening all types of milling cutters, including face mills up to 15 in. in diameter. The ACE is equipped with two types of fixtures, a workhead for supporting tools which must be held by the shank, and a pair of centers for tools which must be held between centers or on an arbor while grinding. The grinding spindle is mounted on a hardened ram which, in turn, operates in a large bearing and is mounted on hardened tracks and balls to provide easy movement. The grinding wheel spindle may be set in any position up to 180 degrees and locked. The machine is completely universal and the angles and clearances are obtained without computation. Driven by a 1 hp motor, it offers 3 speeds . . . 3800 rpm, 4800 rpm and 6000 rpm, vee belt drive.

7. The Oliver Tool Bit Grinder grinds single point lathe, planer and shaper tools to a master template. Designed to hold tools up to 1½ in. wide x 1¾ in. high. Grinding is done on the periphery of a 20 in. wheel. The holder rests on a ball in front of the grinding wheel and is equipped with a template formed to the tool being ground. The template is twice the tool size to reduce possibility of error.

8. Also: Die Making Machines. • •

**"All right—we'll let the manual settle the argument."**


# GRIND WARPED PIECES *Without* SHIMMING

**No Guesswork!**

**Increased Production!**

*Save Time With*

**NEUTROLATOR**

**Holding Power REGULATOR and CHUCK CONTROL**

Neutrolator Electro Magnetic Chuck Control provides regulation of holding power which permits grinding without shimming, to closer parallelism than ever before possible.

In production grinding where holding power must be the same with each work piece, Neutrolator reproduces the same tension on successive pieces without readjustment. Where various tensions are required, a simple dial or pushbutton control provides regulation of holding power. Neutrolator affords complete control of electro magnetic chuck at all times . . . protects chuck from harmful voltage surges . . . demagnetizes both chuck and work piece . . . facilitates easy removal of work, thus eliminates marred surfaces.

**Write for Descriptive Circular**

Telephone: BElmont 5-4010

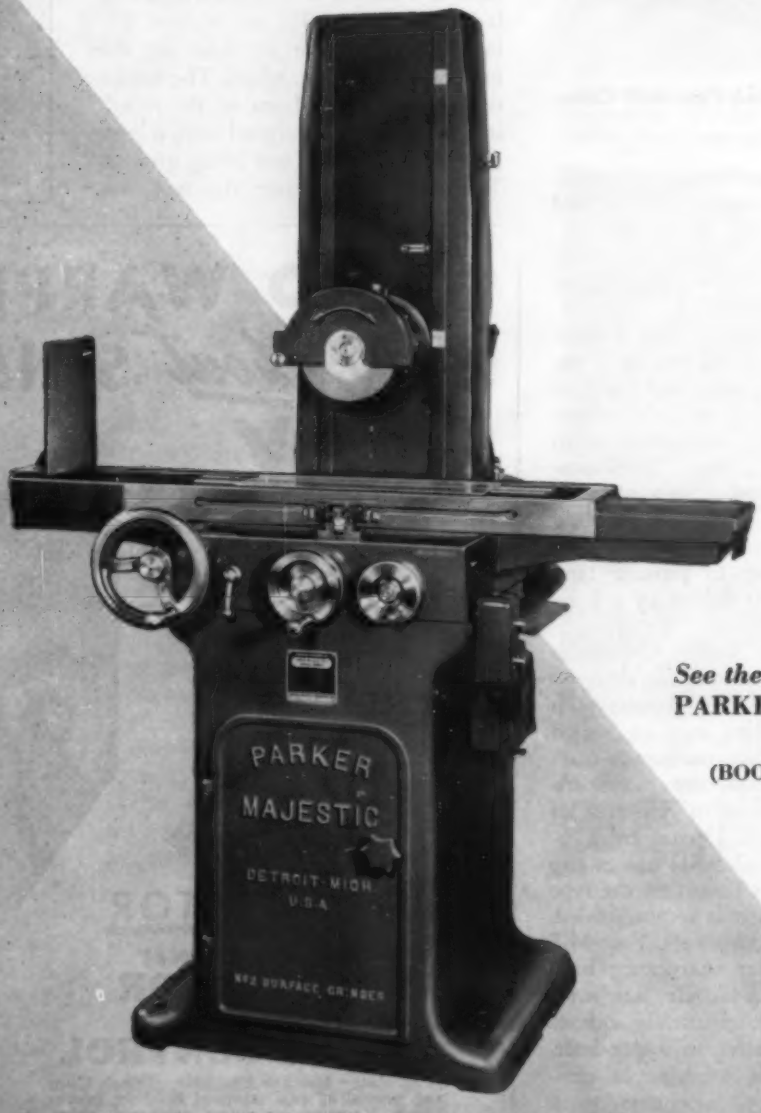
ELECTRO-MATIC PRODUCTS CO.

2237 N. KNOX AVENUE CHICAGO 39, ILLINOIS, U.S.A.

Encircle No. 216 on card, opposite Page 72

PARKER • MAJESTIC PM PRECISION MACHINES

# NO. 2-Z SURFACE GRINDER




*See the* PARKER-MAJESTIC *exhibit* (BOOTH No. 415) *at*

**Elevating hand wheel mounted in saddle.**
**Motorized drive for rapid spindle elevation.**
**Handwheel graduated directly in .0001″ increments.**

DESCRIPTIVE LITERATURE ON REQUEST

**PARKER-MAJESTIC, Inc.**
**147 JOS. CAMPAU, DETROIT 7, MICH.**

PARKER • MAJESTIC PM PRECISION MACHINES

# SEMI-AUTOMATIC INTERNAL GRINDER

**Accurate automatic sizing for production or semi-production.**
**Cam actuated spindle infeed.**
**Micrometer type wheel dresser facilitates size control.**
**Models available in 12″ or 24″ table travel.**

DESCRIPTIVE LITERATURE ON REQUEST

## PARKER-MAJESTIC, Inc.
147 JOS. CAMPAU, DETROIT 7, MICH.

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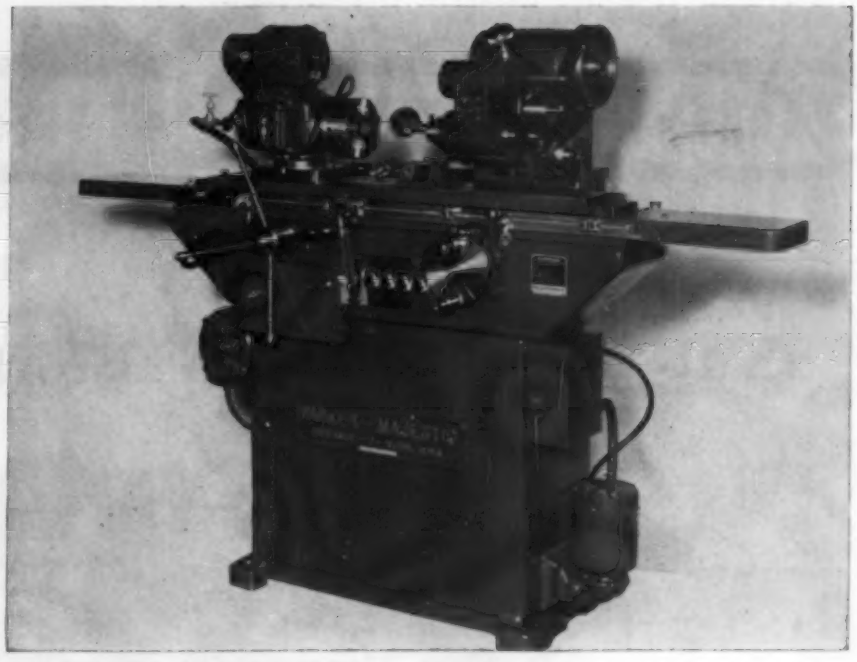
PRESSURELOK-224
RESINOID DIAMOND WHEELS
— the best diamond wheel bond ever developed —
if you've used them - you know they're best!
if you haven't - let us show you!
UNITED STATES DIAMOND WHEEL CO. AURORA, ILL.
US



Parker-Majestic's Semi-automatic Internal Grinder can be used either as a conventional internal grinder or for automatic operation.

## Parker-Majestic's Semi-Automatic Grinder and Surface Grinder . . . Booth 415

**Parker-Majestic, Inc., Detroit, Mich.**

1. Semi-automatic internal machine can be used either as a conventional internal grinder or for automatic operation. Two models, both having a 10" swing over the table, are available. The first has a table travel of 12" and the second a table travel of 24".

Three methods of energizing the table travel are available as standard equipment. The first is "Hand Feed" which is used for manual operation. The second is "Power Feed" which is a gear and rack actuated table movement, electro-mechanically controlled by means of a limit switch. Four rates of speed are available; i.e., 12, 24, 36 and 48 inches per minute. The final method of actuating the table is by means of the "Reciprocator," which is a lever arm mechanism. This enables a table stroke from 0 to 3". The rates of reciprocation are 30, 50, 75 and 100 strokes per minute.

In automatic operation a cam controls the in-feed. The grinding spindle is mounted in a hinge type bracket and as the cam rotates the grinding wheel is fed into the work. A carefully planned cycle of operation insures extreme repetitive accuracy. In this cycle provisions have been made for loading, rough grinding, wheel dressing and finish grinding. When finish size has been attained a dwell period provides "spark out" time, the result of which is better finish and size control.

Spindle in-feed is a direct function of table reciprocation. A ratchet mounted on the cam shaft is energized with each stroke of the table thus imparting rotational movement to the cam. This movement can be adjusted from 1½ to 12° per table stroke.

2. In the No. 2 Surface Grinder the handwheel controlling the vertical elevation of the spindle has been incorporated into the cross-feed saddle of

**No. 2 Surface Grinder has the handwheel controlling the vertical elevation of the spindle incorporated into the cross feed saddle of the machine.**

Encircle No. 218 on card, opposite Page 72

the machine. This handwheel mechanism is so designed that one complete turn imparts to the grinding spindle a vertical movement of only .010 in. The linear spacing between .0001 in. graduations is ⅛ in. on the 4 in. diameter control wheel.

Hand cranking this control wheel would be most tedious and time consuming, to circumvent this detrimental characteristic, power elevation by a direct drive, pancake type motor has been incorporated. The speed of elevation and lowering is 9 in. per minute and can be accurately controlled by the electric switch incorporated.

The vertical column is a heavy solid single casting, accurately machined and hand scraped. It was designed for maximum rigidity so that no chatter would be experienced even with the grinding spindle at its highest point.

As with previous No. 2 machines, this will utilize either the standard motor driven spindle wherein the maximum dimension from the top of the table to the centerline of the grinding spindle is 20 in. or, the multiple speed spindle unit wherein the distance from the table top to spindle centerline is 17 in.

The multi-speed unit is a compact spindle and drive assembly mounted into the cube carrying the spindle in the vertical slides. By a simple "Pick-Off" pulley system in conjunction with an adjustable idler, a choice of seven spindle speeds ranging from 2200 to 6000 RPM is readily available. Users find this ideal when using diamond or off-size wheels.

3. Also to be shown: Surface Grinders; Rotary Surface Grinders; External Grinders. • •

### Motch & Merryweather Circular Saw Blade Sharpeners

**Booth 606**

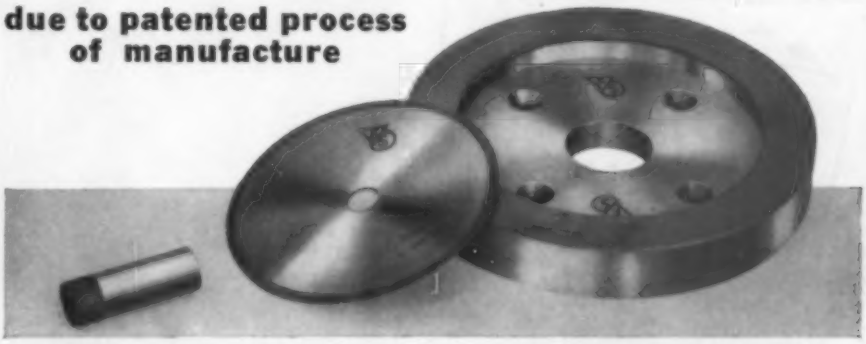
**Motch & Merryweather Machinery Co., Cleveland, Ohio**

1. The G-45 sharpens blades from 8 in. through 45 in. diameter. Grinders feature the ability to grind alternating high and low teeth, the Motch & Merryweather "Triple-Chip grind",—with one setting. The high tooth is chamfered on either side, and the following tooth is square. The narrow tooth roughs out the center and the wide tooth finishes the cut. As a result, three curling chips are formed by two teeth. The grinding contour is automatically produced by cam action with index plates controlling the tooth spacing. Varying diameters, thicknesses, rake angles, and pitches can be ground.

2. Also to be shown: Sawing Machines; Milling Machines; Milling and Centering Machines. • •


**FASTER CUTTING . . . LONGER LASTING**

**due to patented process of manufacture**



**STEELSET Diamond Wheels**

**(for wet grinding)**

Made by a superior patented process, FS STEELSET Diamond Wheels have exceptionally fast cutting properties. Grinding costs are halved. They have excellent non-glazing and non-burning characteristics, coupled with remarkably long life—as much as five times greater than resinoid or vitrified bonds.

Produced by a hot-press powder metallurgical method. The diamond particles are coated by high vacuum technique to insure extra strong gripping action by the sintered steel bond. This prevents their premature pulling out of the metal matrix.

In many types for a wide variety of applications.

*Drills, blades, hones, lens laps, center laps, etc.*

**Attractively priced**

•

**Fast delivery**

•

**WRITE FOR CATALOG DT353**

FISH-SCHURMAN CORP., 81 Portman Rd., New Rochelle, N.Y.

Encircle No. 219 on card, opposite Page 72

**Newman Grinding Wheel Dressers**

*now available at*

***Dealers Everywhere!***

Protect your precious grinding wheels . . . *Particularly your diamond wheels . . .* by *truing and dressing them* with the NEWMAN GRINDING WHEEL DRESSERS.

By actual test, the NEWMAN DIAMOND WHEEL DRESSERS have proven best! Models available for Surface, Cylindrical, Pedestal and Universal Cutter Grinders.

**Manufactured by**

**L. Newman**

**1001 24th Street**

**Oakland 7, Calif.**

**TE 2-5523**

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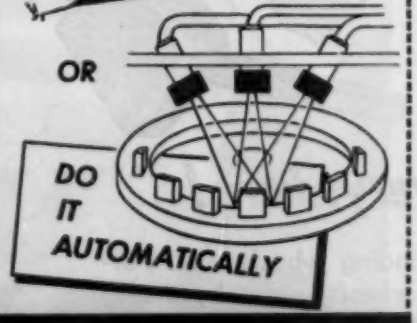
which of these
POLISHING
PROBLEMS
are yours?

CHECK*

- ☐ Reduction of belt sanding stages
- ☐ Cutting down buffing time
- ☐ Reduction of hand polishing
- ☐ Blending directional grind lines
- ☐ Lowering micro-inch finishes
- ☐ Exposing cracks and fractures
- ☐ Smoothing belt marks
- ☐ Imparting non-directional finishes
- ☐ Semi-reflective surfacing
- ☐ Blending brush marks
- ☐ Surface uniformity
- ☐ Removal of stress marks
- ☐ Obliterating
  - ☐ Scores ☐ Tool marks
  - ☐ Reliefs ☐ Chatter
  - ☐ Pits ☐ Scratches
- ☐ Matte finishing
- ☐ Thread fit and turnability

OR

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WET BLASTING
TWO SPEED

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THE CRO-PLATE COMPANY INC.
747-D WINDSOR STREET
HARTFORD 5, CONNECTICUT

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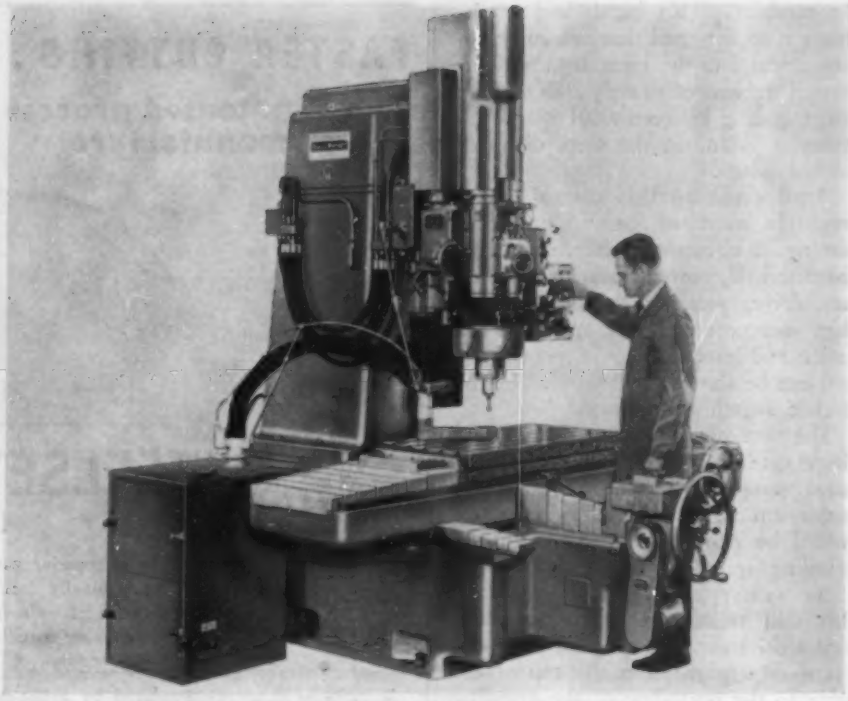

**The Pratt & Whitney Vertical Precision Hole Grinder is designed to grind straight or tapered holes and radii with extreme accuracy in size and position in fast, easy operation.**

## Pratt & Whitney Vertical Precision Hole Grinder . . . Booth 1219

**Pratt & Whitney Division Niles-Bement-Pond Co., West Hartford 1, Conn.**

1. Designated the No. 2E, this Vertical Precision Hole Grinder is designed to grind straight or tapered holes and radii with extreme accuracy in size and position in a fast, easy operation. Grinding speeds range from 4,000 to 100,000 rpm. Table working surface is 22 in. x 44 in.

The No. 2E differs from conventional grinders in that the work is strapped to a table and does not revolve. The grinding wheel has a planetary motion about the vertical axis of the hole being ground and can be fed outward in an increasingly larger radius while the machine is running. This feature—combined with the extremely fast, precise method of positioning the table—makes it possible to accurately locate and grind any number of holes of various sizes in a workpiece without stopping to change the set up.

This P & W Grinder utilizes the same Electrolimit Measuring System as the Pratt & Whitney Series "E" Jig Borers. Table settings accurate to .0001 in. are made quickly and dependably. The two independent Electrolimit Measuring Units—one for transverse and the other for longitudinal settings—obtain basic 1 inch spacings electromagnetically from a solid master bar. Since there is no mechanical contact, there is no wear and the original accuracy is maintained indefinitely. Settings in fractional inches are obtained by moving the electromagnetic unit between the basic 1 inch spacings by means of a super-precision micrometer screw reading direct to .0001 in.

The main spindle and the inner vertical traverse spindle (on which the grinding head with its adjustable cross head slide is mounted) are designed and constructed to maintain their rigidity and accuracy indefinitely without requiring maintenance. Both are mounted in heavily preloaded precision ball bearings. Hydraulic motors provide a wide range of infinitely variable spindle rotation and traverse speeds.

Three interchangeable Pneumatic grinding heads are available. Two are of the air turbine type and provide speed ranges infinitely variable from 60,000 to 100,000 rpm and 30,000 to 50,000 rpm respectively. A speed governor maintains any preset speed regardless of the grinding load, allowing more accurate control of grinding and faster stock removal. A unique air bearing design, where the spindle floats on air under pressure, provides the truest running spindle possible which runs cool even at highest speeds. The third head, a solid piston type providing speeds from 4,000 to 9,000 rpm, is used for grinding larger holes from 6" to 10" in diameter.

2. Also to be shown: Milling, Keller, Die Sinking Machines; Rotary Tables; Machine Control Gages.

See how you can

# Smoke out the Bugs

## from your surface grinding operations

**ABRASIVE** will be at the Machine Tool Show with revolutionary new machinery, features, methods, ideas! Bring your problem "bugs" . . . Abrasive will show you how to grind answers that will "smoke 'em out."

ABRASIVE
ACCURACY BOOSTS PRODUCTION

**ABRASIVE MACHINE TOOL COMPANY**
Dexter Road • East Providence, Rhode Island

Encircle No. A1 on card, opposite Page 72

# Tools – and operators – keep their tempers with Norton wheels

*Only Norton builds these value-adding, time-saving*
*"TOUCH of GOLD" features into wheels for tool room grinding*

**All teeth stay the same height** when you sharpen milling cutters with long wearing, free cutting Norton G Bond wheels that hold size all the way round. 32 ALUNDUM* abrasive permits top grinding speed without burning. The machine is a Norton No. 20 Cutter and Tool Grinder.

No other wheels for tool room grinding are made the way Norton makes them. Exclusive precision processing gives them unusual advantages, including controlled uniformity and built-in balance, that reduce vibration and assure smoother running wheels.

### *Plus The Famous G Bond*

Also, you can get these wheels in the most efficient vitrified bond ever produced — the Norton G Bond, developed especially for precision-grinding the hardest tool steels. Holding the abrasive particles just long enough for maximum cutting action, G Bond wheels: *cut freer, cooler, faster . . . do more work per wheel and cover a wider range of jobs . . . hold corners better, dress easier and grind more pieces per dressing.*

And for rapid stock removal, with especially cool cutting action, Norton 32 ALUNDUM* abrasive is outstandingly popular. With all G Bond wheels you can take heavier cuts in expensive, heat-sensitive steels without drawing temper. They'll reduce tool spoilage, give you closer tolerances and smoother finishes, with fewer wheel changes and machine adjustments — additional "Touch of Gold" benefits that mean better performing tools and better, lower-cost tool room grinding than you ever got before.

### *For Your Carbide Grinding*

Norton diamond wheels, carbide grinding's recognized "Crown Jewels", are products of Norton's long leadership in diamond wheel development. Made in all required bond types, their accurate cutting action and extra long service life bring you top savings in every single-point and multi-tooth carbide grinding application. Also available are CRYSTOLON* wheels — green and gray — with the cost-cutting K Bond.

### *Your Norton Distributor*

will gladly recommend the right Norton wheels for your tool room requirements. Or write direct. And remember: only Norton brings you such long experience in both grinding wheels and grinding machines — your assurance of the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

**Offhand grinding a planer tool** is a fast, cool operation with Norton G Bond wheels. ALUNDUM* abrasive permits top grinding speed without burning.

**For the latest information on grinding visit us at**

## SPACE 516

## MACHINE TOOL SHOW

**International Ampitheatre, Chicago**

Norton abrasive engineers and grinding machine engineers will be available to help you solve your grinding and finishing problems

W-1660

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***and its BEHR-MANNING division***

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

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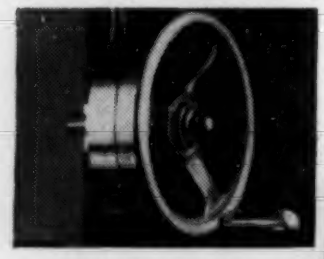
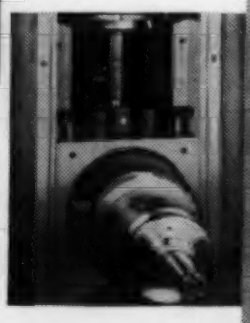
# Accurate Grinding

## FOR SMALL PARTS



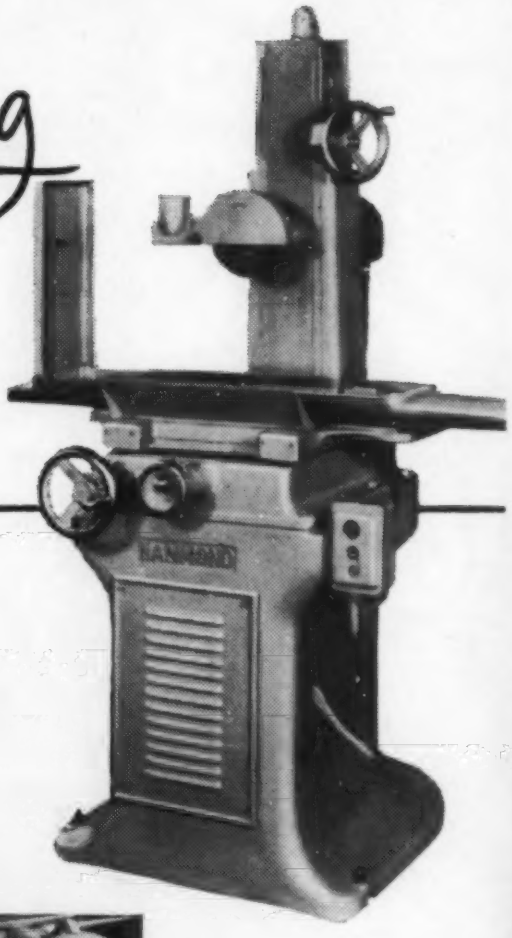
**ACCURATE SPINDLE ADJUSTMENT**

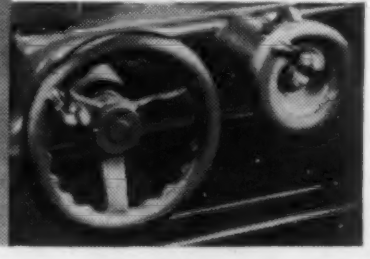
Standard vertical adjustment of spindle through handwheel is .0005". With Vernier attachment, spindle can be raised accurately to .00005".



**SOLIDLY SUPPORTED SPINDLE CARRIER**

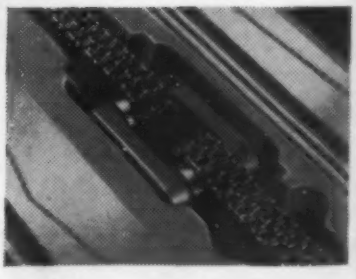
Spindle carrier is moved vertically on double dovetail ways with adjustable tapered gibs.





**CONVENIENT HAND CONTROL**

Handy wheels for cross travel, accurately gauged to thousandths, and quick acting longitudinal travel.



**SMOOTH ROLLER CHAIN TABLE DRIVE**

Remarkably smooth finish on work without chatter marks frequently found when table is moved by conventional means through rack and pinion.

■ The Hammond No. 2, 6" x 18", Surface Grinder is a precision tool room machine for use on the most accurate gauge and tool work.

The standard spindle is direct motor driven and is mounted on precision preloaded ball bearing. Total vertical adjustment is 10¾". In and out movement of table is 6½" with a longitudinal travel of 18".

***Write or wire for further information.***

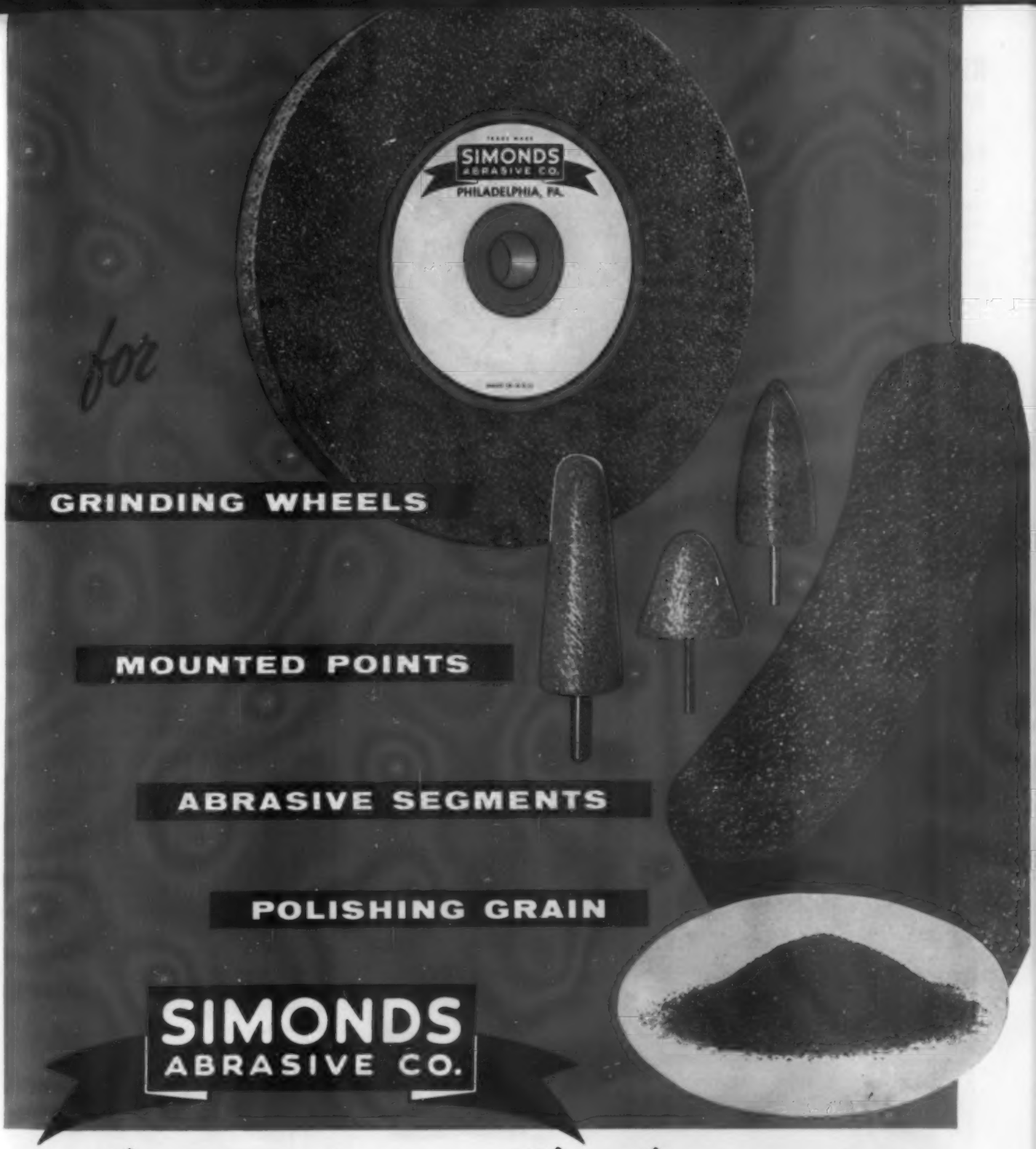
**THE FOOTE-BURT COMPANY • Cleveland 8, Ohio**

Detroit Office: General Motors Building.

# FOOTBURT

## SURFACE GRINDING

Encircle No. A3 on card, opposite Page 72

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What's *your* idea of service? Here's ours! A distributor network geared to help you over production crises as well as in your everyday grinding problems. Free consultation with our field engineers to search out new economies for you. Close teletype communication between our main plant and branches to expedite your orders. New mass production equipment to give you 3 to 4 weeks delivery on small diameter wheels . . . plus the extra product service inherent in Simonds manufacture. If this concept of service coincides with yours, get it by specifying Simonds Abrasive products.

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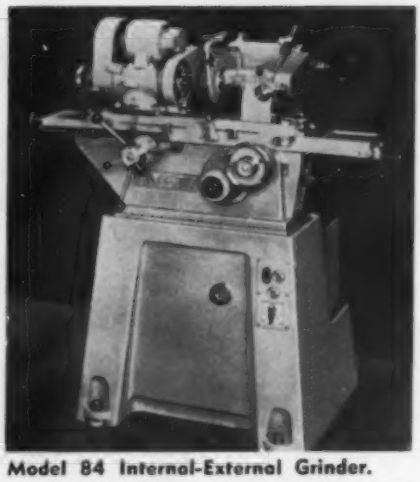
Division of Simonds Saw and Steel Co., Fitchburg, Mass. • Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y.,
Simonds Canada Saw Co., Ltd., Montreal, Quebec, Lion Grinding Wheels Div., Brockville, Ont. and
Simonds Canada Abrasive Co., Ltd., Arvida, Quebec

Encircle No. 222 on card, opposite Page 72

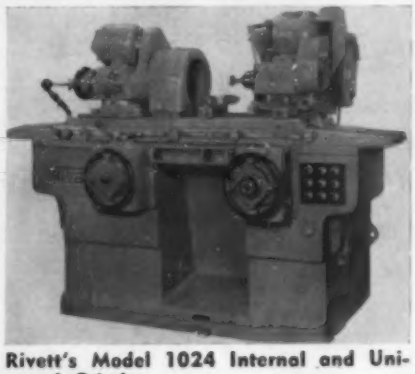
## Rivett's Internal and Universal Grinder and Model 84 Internal-External Grinder . . . Booth 805

**Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Massachusetts**

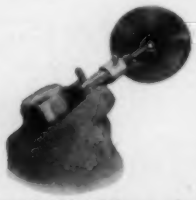
1. Model 1024 Internal and Universal Grinder. Set-up time is slashed with this grinder. Double-end wheelhead swivels 180° for quick conversion to internal or external work. Grinds holes plus 0.0003 in., minus 0.0000 in. Hole to 9 in. dia., external to 12 in. dia.
2. Model 84 Internal-External Grinder. Flexibility of operation and simplicity of design reduces set-up time of diversified jobs of toolroom and die shop. Mounts interchangeable wheelheads for internal and external spindles. Hole capacity is 3 in. dia.; external is to 3 in. dia. • •



**Model 84 Internal-External Grinder.**



**Rivett's Model 1024 Internal and Universal Grinder.**

PERFECT FOR INTERNAL HOLES AND IRREGULAR DIES

REACHES "INACCESSIBLE" PLACES — THE FINEST DETAILS

TO FINISH IRREGULAR AND CURVED SURFACES— ALSO SHOULDERS AND RECESSES

**Di-Profiler**

RECIPROCATING HAND MACHINE

A rapid, accurate, easy-to-operate tool that saves costly hours on dies, molds and precision parts. Indispensable for filing, scraping, lapping and polishing operations involving flat or curved surfaces. Intricate details are finished in a fraction of normal time.

The Di-Profiler has a stroke adaptable from 0 to 6 mm. (¼"); reciprocation can be varied from 0 to 100 strokes per second.

Accessories include steel and diamond files, diamond discs, laps, T-C scrapers, and other tools.

*For complete details, write Dept. D93*

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*Special products for finishing*

**HYPREZ**

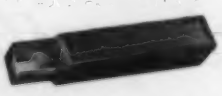
DIAMOND COMPOUNDS

For all finishing jobs, from roughing to mirror polish, Hyprez, the original Diamond Compounds, have world-wide acceptance for their superior quality and results.

The exclusive Hyprez vehicle, exactly graded diamond particles, rigid control of quality, all guarantee that Hyprez will do your finishing job best. Available in 18- and 5-gram sealed cartridges for use with the Hyprez Applicator Gun.

*For complete details, write Dept. H93*

FOR FINER FINISHES FASTER ON DIES



ASSURES LONGER TOOL LIFE, GREATER PRODUCTION

COST SAVINGS FOR MOLDS AND HOBS

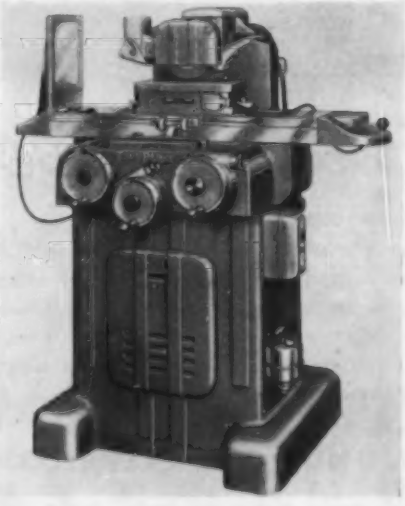

## Taft-Peirce Surface Grinders and Magnetic Chucks

**Booth 811**

**The Taft-Peirce Mfg. Co., Woonsocket, Rhode Island**

1. Machine Tools in operation will be a No. 1 Precision Surface Grinder, a 6 in. Rotary Surface Grinder, a 24 in. Rotary Lapping Machine, and a Back Spot Facing Machine. Grinder accessories will include a Taft-Peirce spindle tilting attachment, high-speed grinding attachment, index grinding fixture, and angle, radius, and narrow wheel dressers.

**Taft-Peirce Precision Surface Grinder.**



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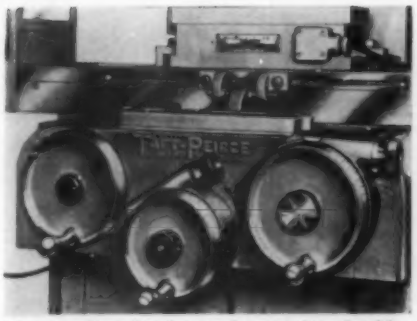

**Vernier fine feed attachment for the No. 1 Precision Surface Grinder permits grinding to .00005-in.**

Vernier fine-feed attachments for vertical and cross-feed on the No. 1 Precision Surface Grinder permit grinding to .00005 in. A Precision Feed Screw and Nut eliminates any tendency for the saddle to "jump" when sidewheel or form grinding to tenths or less.

2. Taft-Peirce Superpower Magnetic Chucks, both electromagnetic and permanent magnet types, will be in operation, in sizes ranging from 3 in. x 6 in. to 10 in. x 15 in. Several styles of chucks will be shown, including rectangular, rotary, tilting base, and sine angle models. Magnetic parallels and V-blocks will be standard accessory equipment.

3. Also: Fixed Gages; Rotochek Automatic Thread Gaging Units; Air Gages; Small Tools. • •


WALLS TU-WAY BELT SANDER

USE IT EITHER WAY

Full 1/3 h.p. G. E. Motor

At last, a top quality industrial sander that provides all the most wanted features — yet sells for so little.

complete with cord, plug, switch ready to use $89.95

*Illustrated Literature on Request*

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CUT OUT CHATTER
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CHATTER
THAT STARTS HERE!

GRIND WITH RED-E PRECISION ANTI-FRICTION CENTERS

• Eliminate down time changing wheels, diamonds and coolants—have micro finish, *always!* Only RED-E Precision ABEC-7 Spec. angular contact, preloaded, locked-in-bearings have the ability to support the radial and thrust capacities demanded of modern grinding applications.

| TWO TYPES FOR YOUR NEEDS | TAPERS AVAILABLE | | | | |
|---|---|---|---|---|---|
| | Morse | B&S | Jarno | Norton | Landis |
| SHANK TYPE | 1 to 6 | 5 to 15 | 4 to 20 | 10 to 16 | .8125, 1.335, 1.750 |
| SPINDLE TYPE | 2 to 7 | 7 to 18 | 6 to 20 | 10 to 24 | .8125, 1.335, 1.750 |
| | Special heads, tapers, shanks and points made to order. | | | | |

*Your* RED-E Industrial Distributor has the "know how" to solve your grinding problems—ASK him *now* for the new RED-E Catalog No. G550-1. It's all you need!

RED-E TOOLS READY TOOL COMPANY
566 Iranistan Ave. • Bridgeport 5, Conn.

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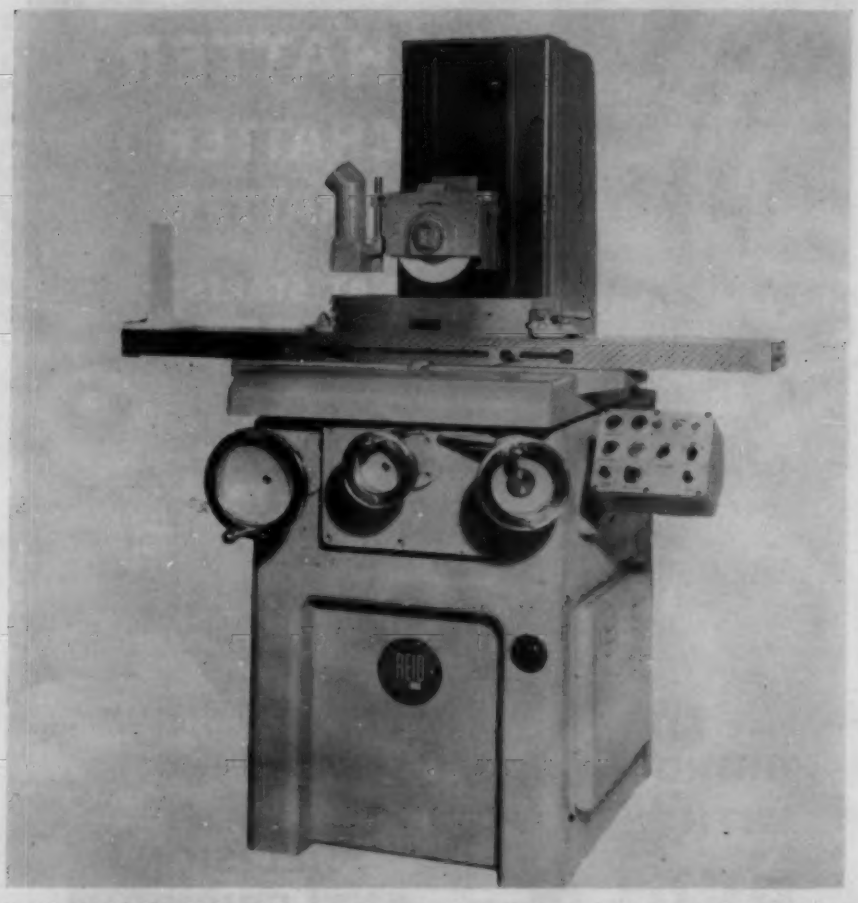
## Reid's New 6x18 Surface Grinder . . . Booth 108

**Reid Brothers Company, Inc. of Beverly, Mass.**



**Reid's Model 618-PF is a fully electric powered, push-button Precision Surface Grinder.**

1. The new Reid-O-Matic, Model 618-PF, is a fully electric powered, push-button automatic 6 in. x 18 in. grinder of very heavy construction for use in production line or tool room grinding.

Dial controlled speed of the table is variable from 0 to 70 feet per minute in infinitely fine degrees. Table reversal is accomplished without reversing the driving motor. Cross-feed drive is dial controlled for infinitely fine adjustments from 001 in. to 7/32 in., and a selector switch controls cross-feed at either or both ends of the table travel.

Power rapid traverse of the cross-feed rapid power elevating head, and automatic cycle of the cross-feed are push-button controlled. The grinding head is newly designed with adjustable gibs. Cross-feed screw and elevating screw have ground threads. Automatic lubrication to all way surfaces operates continuously, and constantly rotating and moving parts are mounted in one transmission and continuously splash lubricated. Dust guard protection is provided for all way surfaces.

2. The Model 618-PT also to be shown incorporates a power driven table with hand driven cross-feed.

3. Model 618-HF has hand driven Table and Cross-feed. • •

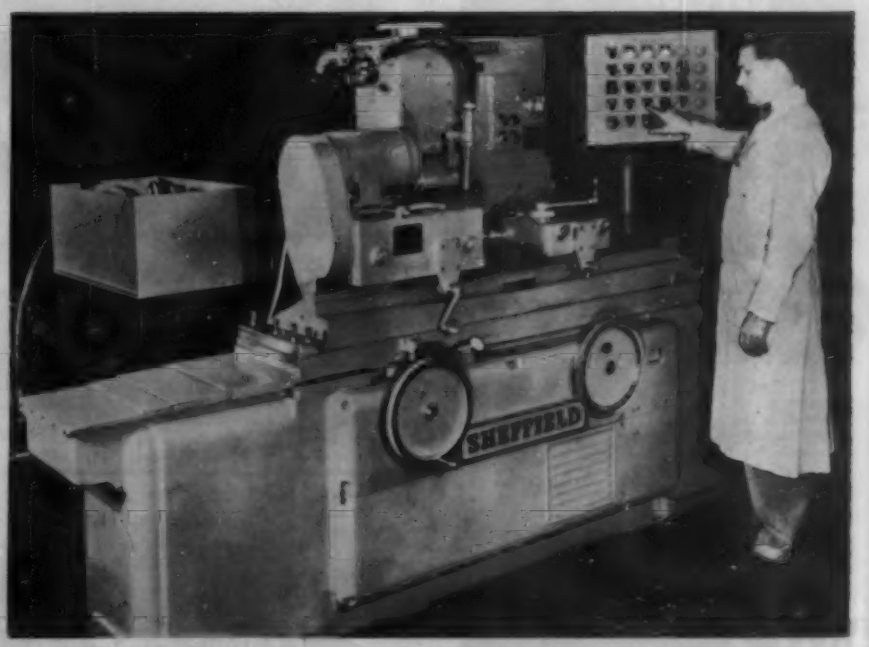
## Sheffield's Form Grinder and Ultrasonic Grinder . . . Booth 1305

**The Sheffield Corp., Dayton, Ohio**

1. Sheffield Model 180 Multi-Form Grinder is a new machine designed especially for the Crushtrue dressing process. It uses a 4" wide wheel and will grind work up to 10 in. in diameter and will accommodate a workpart 24" long. It is available with built-in size controls for automatically bringing parts to finish size.

Model 180 features an automatic Crushtrue wheel dressing device, variable speed control for automatic fast and slow feed of the wheel into the work, and an automatic plunge grinding device with 1 in. rapid approach and retraction of the wheel to the work. In addition, the wheel has cam controlled feed of .250 in., with dwell time variable.

2. Model 134 Precision Thread and Form Grinder with manually initiated automatic cycle is a completely new machine designed for the production of precision ground threads and forms on small parts, instrument components,




**Sheffield Model 180 Multi-Form Grinder is a new machine designed especially for the crushtrue dressing process. It uses a 4" wide wheel and will grind work up to 10" in diameter and will accommodate a workpart 24" long. It is available with built-in size controls for automatically bringing parts to finish size.**

**Sheffield Model 134 Precision Thread and Form Grinder with manually initiated automatic cycle is a completely new machine designed for the production of precision ground threads and forms on small parts, instrument components, and taps.**

**Model 1000W Sheffield-Cavitron ultrasonic machine tool is used to cut, drill, emboss or transfer simple or intricate designs and shapes into and through hard, brittle metals and materials such as carbide and ceramics.**

**Sheffield Model 123 micro-form grinder for grinding cylindrical work and circular form tools up to 8" in diameter and 8" in length.**

and taps. It is small and compact, requiring only 48 in. x 50 in. of floor space. It can grind threads up to ½ in. in diameter. Maximum capacity between centers is 4 in. Maximum length thread: 3 in. Pitches 120 to 20 TPI. Maximum wheel size 8 in. O.D. x 3 in. I.D. x ½ in. wide.

3. Model 123 Micro-Form Grinder for grinding cylindrical work and circular form tools up to 8 in. in diameter and 8 in. in length. Work is ground directly from a drawing; neither templates nor masters are required. This machine features a heavy duty dead center circular grinding unit integral with upper table slide. Wheelhead motor, 1 hp. Wheel—7 in. O.D. x ¾ in. I.D. x ¼ in. wide.

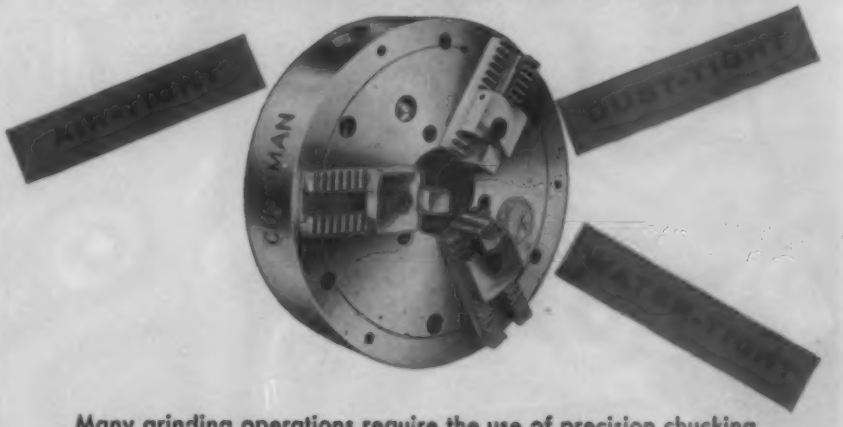
4. Model 1000W Sheffield Cavitron ultrasonic machine tool is used to cut, drill, emboss or transfer simple or intricate designs and shapes into and through hard, brittle metals and materials such as carbide and ceramics. Machining is accomplished by a cutting tool of the desired shape or form reciprocating at ultrasonic speeds and driving an abrasive grit solution against the workpiece, chiseling away very fine particles to produce the desired shape.

5. Model 140 Gear Grinder is designed for the production of precision ground helical and spur gears from 8 to 50 pitch. The grinding wheel is formed by the Crushtrue dressing process to the basic rack form and then finish dressed with a cam operated diamond dresser. Maximum work diameter of 8 in. and the grinding stroke 4 in. A number of gears of the same type can be ground in the same setup.

6. Model 122 Micro-Form Grinder is for grinding circular and flat form tools and work, templates, profile gages, cams, dies, and Crushtrue rolls. Work is ground directly from a drawing of


CUSHMAN *Air-tight* CHUCKS

FOR WET OR DRY GRINDING OPERATIONS




Many grinding operations require the use of precision chucking. Protection of the internal parts of these chucks from damage due to excessive dust or abrasive particles has always been a problem. Cushman "Air-Tight" Chucks are completely enclosed and sealed against entry of air, water and dust.

Cushman "Air-Tight" Chucks require adapter plates for mounting and are available in 7½", 10", 12" and 14" sizes (other sizes on application). Special master jaws are of heat treated alloy steel, and top jaws are designed to permit a wide range of holding capacity.

Specify Cushman "Air-Tight" Chucks for your grinding operations.

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Air Operated Chucks, Cylinders, and Accessory Equipment . . . The Cushman Power Wrench . . . Cushman Manually Operated Chucks and Face Plate Jaws.

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50 to 1 ratio and can be checked without removing from the machine. Neither templates nor masters are required. Model 122 has a 30 power viewing screen and scope.

7. Model 109 Annular Form Grinder is for the rapid production by Crushtrue grinding of cylindrical forms such as circular form tools, ball bearing seals, seaming rolls, "0" ring groove grinding, aircraft and servo valves, automotive and farm implement transmission parts and other annular forms of intricate and precise profile.

The machine has a capacity of 12 in. between centers and will grind a maximum diameter of 4 in. with a 14 in. wheel while accommodating work parts up to 7 in. in diameter. It is available with a live or dead center workhead. Adjustable speed ranges from 64 to 1050 rpm.

New features on this machine include an automatic grinding wheel infeed device, manually and automatically initiated.

8. Sheffield Model 101 Thread and Form Grinder is for fast, accurate, low cost grinding of threads and forms. The wheel may be formed by Crushtrue grinding, by diamond dressed multi-ribbed wheel grinding, or by conventional single-point wheel grinding.

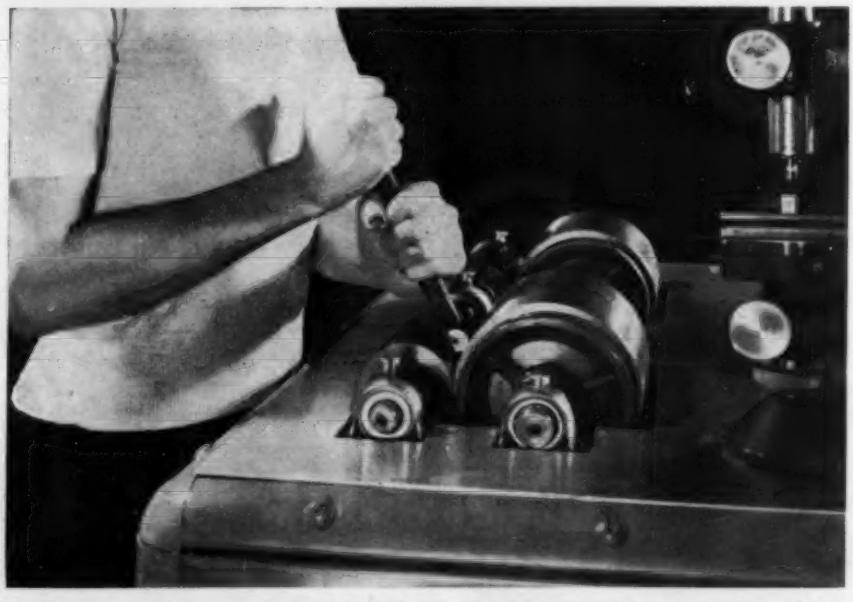
The machine has a capacity of 12 in. between centers and will grind a maximum thread length of 8 in. and a maximum thread diameter of 3 in. It uses a 13 in. diameter wheel up to 1¼ in. wide for threads. Two inch wide wheels can be used for forms. It has a helix angle adjustment for up to 20 degrees either right or left hand. It may be equipped with lead varying mechanism. Change gears are provided for all standard U.S. pitches, 8 to 60 inclusive. Wheelhead speeds 1750, 2000, and 2200 rpm. Wheelhead motor 5 hp., workhead motor—1/3 hp.

New features on this machine include: automatic plunge wheel infeed device with manually initiated starting for fully automatic grinding cycle; plunge depth capacity .250 in. with dwell time variable. The automatic electrically powered Crushtrue dressing device has timer control of crushing cycle during wheel dressing.

9. Also to be shown: Gear and Spline Chamfering Machine; Automatic Welding Machine; Pipe and Bolt Threading Machine; Pipe and Tube Cut-Off Machine; Quick-Center Machine; Gages and Measuring Instruments. • •

## Size Control's Improved Centerless Lapping Machine . . . Booth 417

**Size Control Co., Div. Am. Gage & Machine Co., Chicago, Ill.**



**On Size Control's new centerless lapping machine adjustment and spacing of the rollers is easier because a new fine adjustment locking device with special 6-in. scale permits the operator to set the rolls as he requires.**

1. On this new Centerless Lapping Machine adjustment and spacing of the rollers is easier because a new fine adjustment locking device with special 6 in. scale permits the operator to set the rolls as he requires. Special hold-down lever requires less pressure to be applied by the operator to the work piece. This virtually eliminates the need for lapping sticks, reduces operator fatigue, and speeds up the lapping operation. A special "Back-Height Adjustment" enables the operator to tilt the machine forward for increasing working comfort. Tilting the machine towards a convenient work angle also helps to improve worker efficiency.

Needle bearings assure longer roller life and rolls can be dressed in place . . . while the machine is operating.

Dressing used to require as much as an hour and 15 minutes a day, 30 minutes to take the roll out, 15 minutes to grind it, 30 minutes to put the roll back. Now this operation can be accomplished with the special hold-down device in one fifteenth the time, less than 5 minutes. Absolutely no grinding is required with the new hold-down dressing device.

A special Size Control Diamond Wheel for the Centerless Lapping Machine has been in operation 4,000 hours for the past two years. This new diamond wheel has been used for lapping carbides. A good finish can still be obtained from this wheel and this is why such a statement is remarkable: This wheel has never been treated with lapping compound, it has worn .0001 in. and still has .1250 in. wear life remaining.

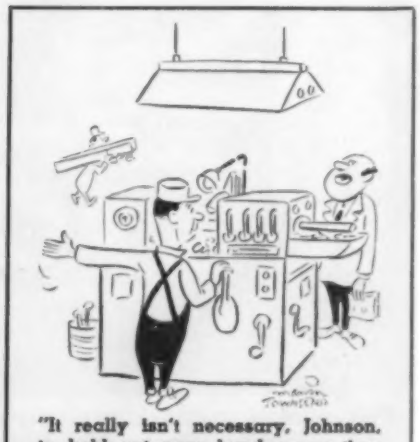
2. Also to be shown: Gripmaster; Boremaster plain rings. • •

## Sundstrand to Show Magnetic Coolant Separators . . . 1412

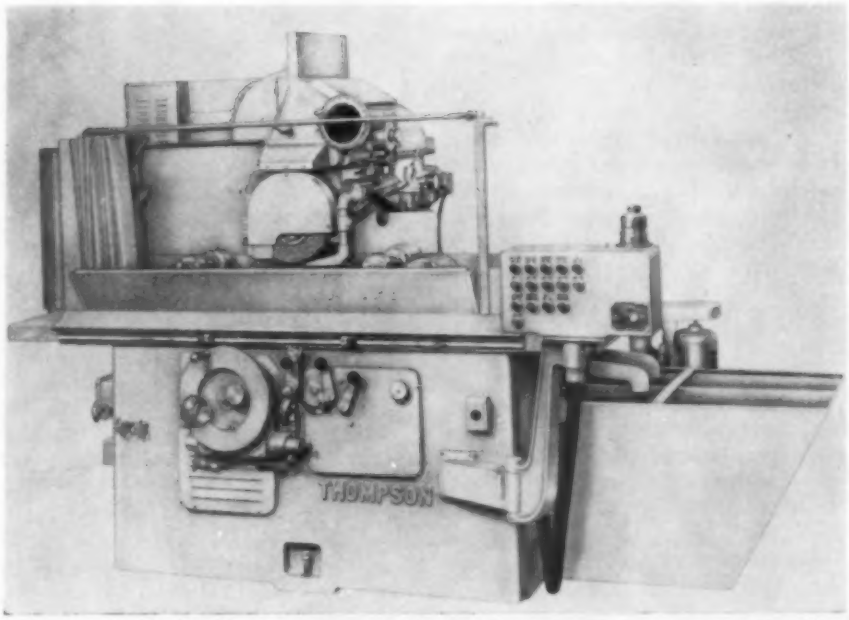
**Sundstrand Magnetic Div., Sundstrand Machine Tool Co., Rockford, Ill.**

1. Important feature of the Sundstrand Coolant Separator is that it can be dropped into position on almost any open type coolant tank. No additional piping is required.

2. Also to be shown: Universal Magnetic Fixture installed on a Milling Machine.



**"It really isn't necessary, Johnson, to hold out your hand every time you turn out a new part."**




**Type "B" Truforming Grinder is the latest development in the art of crush form grinding of precision contours on a production basis.**

## Thompson to Show Complete Line of Grinders . . . Booth 1407

**The Thompson Grinder Co., Springfield, Ohio**

1. Type CXV 36x36x120 in. Double Head Way Grinder features steel-back, silver lined bearing spindle, with integral motor drive and segmental shoe thrust bearing. The hydraulic system is in a separate tank, isolated from the bed of the machine, with all valves and controls including Thompson variable volume vane type pump enclosed in this tank. The machine is equipped with Thompson patented anti-friction elevating nut giving extreme accuracy and response of the seating of the wheel to the work without the use of counter weights.

The vertical wheel head is powered with a 5 hp adjusto-spede unit operating from 1600 to 4800 rpm, thus giving speed variations for different diameter of grinding wheels as well as being able to compensate for the variation in the grinding due to the cup wheel grading. The vertical head is equipped with power rapid traverse as well as manual adjustment. The vertical head is inclinable and the vertical feed is accomplished with the same elevating hand wheel as is used for the horizontal wheel. Temperature balance is maintained on the machine by means of a heat exchanger to control the overall temperature of the machine including the coolant. Adjustable angular electric dressers are supplied to insure the precise truing of proper angles for dovetails and Vee way bearings. Dual hydraulic cylinders to the table are standard equipment thus insuring accurate speed in both directions of the table movement with shockless reversal and safety retard action at the extremities of the table stroke.

2. Type "2F" 8 x 10 x 24 in. Surface Grinder features a cross feeding wheel head with horizontal spindle grinding with the periphery of the wheel.

The machine is equipped with a new coolant system consisting of flood coolant externally and coolant through the wheel, with either or both methods available from the same coolant line. It is also equipped with an "in position" wheel truing device that permits re-dressing of the wheel without removal of guards or any of the details.

Machine features: simplicity of control, double length box-type bed with flame hardened bed ways, anti-friction hardened and ground elevating ways, and flame hardened and ground cross slide ways.

The machine is equipped with a 1½ hp 2-speed, 1800/3600 rpm in-built motor driven spindle accommodating a 12 in. diameter x ¾ in. face x 3 in. hole grinding wheel.

3. Type "B" Truforming Machine Size 12 x 12 x 20 in. is equipped with a 12 in. diameter x 2 in. face x 5 in. hole grinding wheel, mounted on the time proven in-built motorized spindle. Great care is necessary in the manufacture of a wheel spindle for crush form grinding as end play of the spindle is extremely critical on this type work.

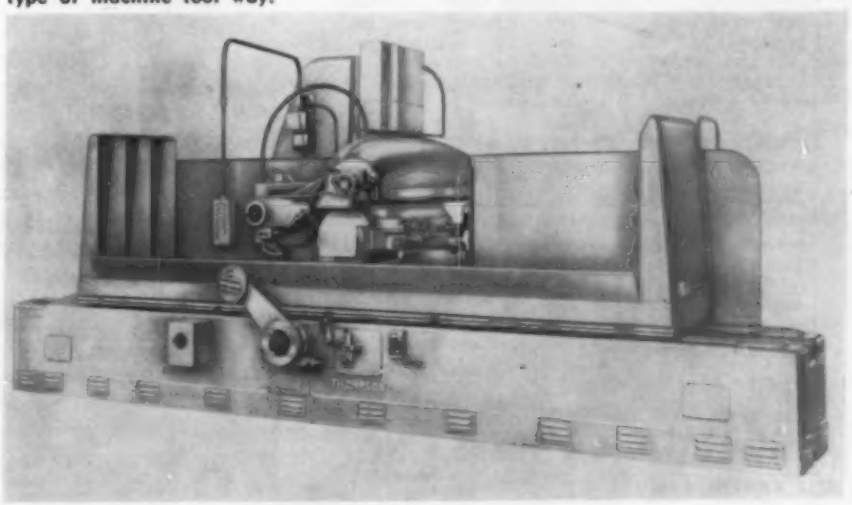
The two-roll system is utilized whereby a work roll for repeated crushing during grinding operations is utilized as wel. as a reference roll for reconditioning the work roll.

The Thompson principle of timed automatic down feed for crushing at reduced wheel speed has made it practical to utilize this crushed wheel principle on production grinding of precision contours.

4. Type "D" 6 x 10 x 18 in. Surface Grinder is completely anti-friction throughout, including the table cross slide and elevation slideway bearings. The bearings are hardened tool steel precisely ground with contoured raceways with all bearings pre-loaded to confine these important slide movements in an accurate, straight plane. Each slide is pre-lubricated and permanently sealed.

The cross feed is accomplished by the movement of the wheel head mounted in the column and the entire unit has a cross travel of 6½ in. Both the cross feed and the elevation units are equipped with vernier adjustments permitting the accurate feeding of these movements within .0001 in. The ma-

**Thompson's Double Head Way Grinding Machine capable of grinding almost any type of machine tool way.**



chine features three-point leveling.

5. Six-inch Twin Rotary Production Surface Grinder features two work tables with 180° automatic indexing cycle.

One of the features of the machine is the setting of the cut to contact the work piece automatically and then feed to size, spark-out and index. The machine is also equipped with automatic gauging so that when the parts are removed from the grinder they are completely inspected for size thickness assuring the accurate production of parts on a high production basis.

The machine is equipped with Microflex counter so that after so many parts have been ground, the wheel is automatically dressed and compensation is made so that the grinding cycle can be continued.

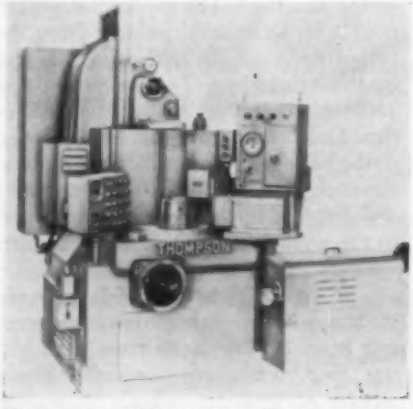
The machine is equipped with a 5 hp, in-built motor driven spindle mounted in anti-friction bearings. Hardened and ground elevation ways as well as anti-friction elevating nut is featured.

6. Model "G" 12 x 16 x 36 in. Hydraulic Surface Grinder is a new deluxe model machine with every conceivable feature desired in a hydraulic surface grinder of this type, keeping in mind ease of operation, accuracy and simplicity. It is a horizontal spindle, cross feeding wheel head type with the following outstanding features.

One of the outstanding features is an electric automatic wheel truing device, mounted on the side of the wheel head having automatic feed and compensation. In other words, all that is necessary for the operator to do to dress the wheel is to push the button. The wheel is dressed, and the amount dressed from the wheel is automatically compensated on the down feed.

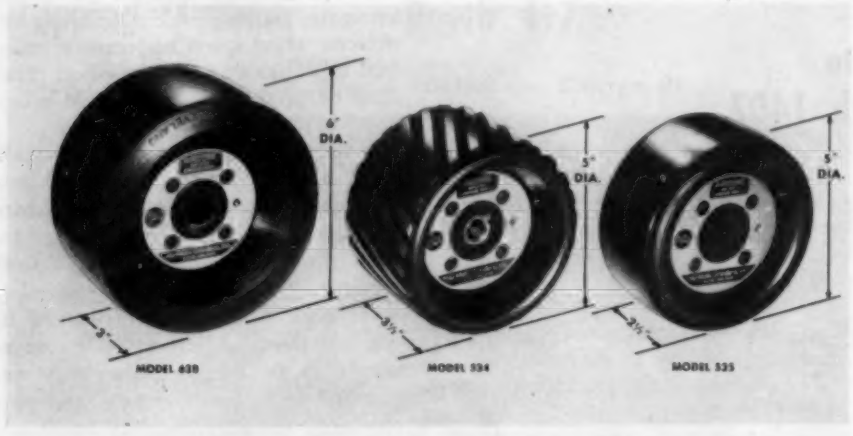
**Type "2F" 8 x 10 x 24 Surface Grinder is extremely accurate and is guaranteed to grind to .0001-in. accuracy.**

The wheel head features the proven in-built motor design with the spindle mounted in permanently lubricated anti-friction bearings. The wheel head is mounted on anti-friction cross slide bearings for ease of movement and to enable the precision grinding of shoulders. The entire wheel head and saddle assembly are mounted on vertical anti-friction bearings, permanently lubricated. The entire unit can be moved by power elevation for rapid traverse, automatic increment down feed with coarse approach and fine feed for finish as well as manual pick feed control. • •



**Thompson's 6-inch Twin Rotary Surface Grinder is a high production tool designed to eliminate the down time of loading and unloading a surface grinder.**

**New deluxe model surface grinder.**


# New Aircore Grinding Wheels

## cut faster . . . feature interchangeable contact drums

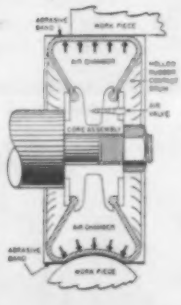
One universal core assembly and a range of contact drum sizes—these are the ingredients for a new line of Aircore Inflated Grinding Wheels. To change wheel sizes you simply change the drum. Complete changeover takes less than five minutes. All three models shown above are available with plain or serrated contact faces and can be used with all standard drive methods.

Because the contact area is always pliable, the wheel shapes itself to the contour of the work. Thus, you get up to 3,000% greater abrasive contact area than with hard-wheel grinders. This means a greater area finished with each pass.

As "set-up" wheels, Aircore Grinding Wheels provide complete uniformity of finish with no maintenance headaches. Inventories of buff sections, glue and grain are eliminated. Space required for the fabrication of conventional "set-up" wheels can be utilized for production work.

COMPARE AT OUR EXPENSE. Send for 25-day free trial. Give job requirements and type and size of power tool used.

N-113



The Aircore Inflated Grinding Wheel is built like an auto tire—flattens out at point of contact — contours to work surface.

**NU-MATIC GRINDERS, INC.**

8224 Carnegie Ave. Cleveland 3, Ohio

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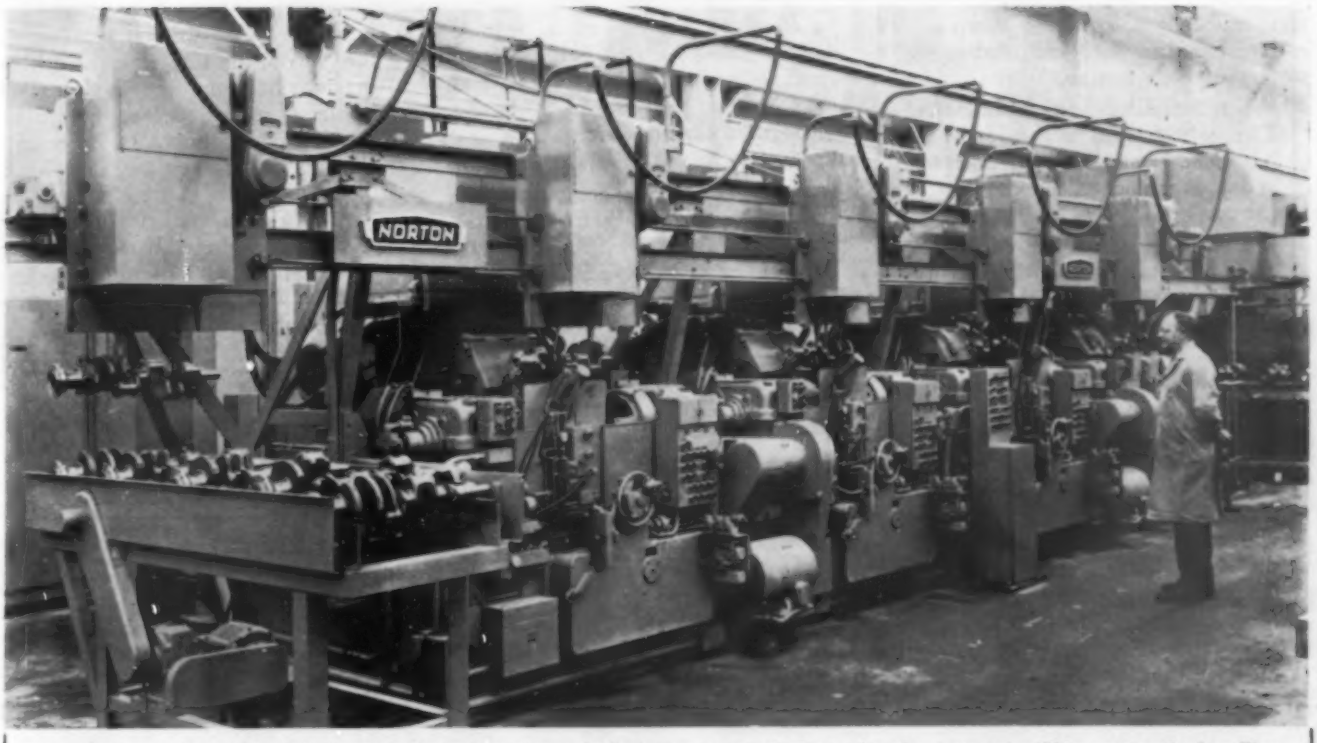


**Transfer Type Crankpin Grinder is fully automatic and eliminates manual duties by the operator. This automatic handling and grinding cycle is repeated at each station as the crankshaft is transferred from one grinding station to the next and finally to the conveyor line. Automatic truing of the grinding wheels at predetermined intervals provides close control of the amount of abrasive removed from each wheel.**

## Norton Transfer Type Crankpin Grinding Machine

The Norton Transfer Type Crankpin Grinder is fully automatic and eliminates manual duties by the operator in inserting, clamping, adjusting, controlling, gaging and removing the crankshaft from the machine.

This automatic handling and grinding cycle is repeated at each station as the crankshaft is transferred from one grinding station to the next and finally to the conveyor line.

Automatic truing of the grinding wheels at predetermined intervals provides close control of the amount of abrasive removed from each wheel. Wheels may be trued after one or more grinds to obtain the best wheel economy.

The machine is built in sections consisting of two stations. Each station comprises a grinding wheel head mounting a 42 in. diameter grinding wheel and a pair of work heads.

For grinding V-8 shafts, two sections are required. For six cylinder shafts three sections are necessary unless the length of the shaft makes it adaptable to a two section set-up. For grinding 4 cylinder shafts with two pins in the same plane, one section is normally required. Crankshafts for eight cylinder in-line motors require four sections.

**Work Holders and Work Spindles:** The work heads in each station have hydraulically clamping work holders. These are mounted on preloaded, antifriction bearing spindles. Finished surfaces on the base provide for checking alignment of the work holders. The work spindles are of the cartridge type wherein the bearings are assembled and sealed at the spindle factory.

**Work Spindle Drive:** The work spindles are synchronously driven by a central point driving arrangement for equalization of torque deflection. Means for synchronization of work heads are also provided. A positive work stop mechanism on work drive stops the work in the exact angular position required. Work drive is interlocked to prevent incorrect positioning of workpieces in holders, the unlocking of work clamps when work is not correctly located angularly, and to prevent advance of the wheel slide unless the work is properly located and clamped.

**Wheel Slides:** The wheel slide for each grinding station is provided with automatic rapid infeed, shoulder feed, body feed, sizing feed and die-out, controlled by either an electric timer or automatic grinding gage, both furnished with the machine and interlocked with work clamping, starting and stopping, and with loader functions. Each wheel slide is equipped with automatic constant peripheral wheel speed control, utilizing a constant 25 hp. variable speed D.C. motor with D.C. supplied from an A.C. source.

**Wheel Truing:** Each wheel slide also is equipped with an automatic wheel guard type face truing device with wheel reduction compensation mechanism which automatically resets the wheel slide after truing. The automatic wheel face truing device is tied in with the cycle to function at any predetermined interval.

**Wheel Spindles:** The wheel spindles take 42 in. diameter grinding wheels between the bearings. For wheel change, the spindle and bearing assemblies are removed as a unit without disturbing bearing adjustments. A hydraulic lifting mechanism, manually controlled, swings back the upper half of the wheel guard for removing the spindle.

**Steadyrests:** A hydraulically-operated, automatic follow-up, two bearing, positive stop steadyrest at each grinding station supports the pin being ground.

**Pump Units:** Each section of two grinding stations is hydraulically

operated by a hydraulic pump and reservoir unit floor mounted at the rear of each section.

**Wheel Spindle Bearing Lubrication:** The wheel spindle bearings are lubricated from a third reservoir and pump mounted on the rear of the section.

**J. I. C. Standards:** The entire machine conforms to J. I. C. Electrical and Hydraulic Standards with minor exceptions.

**Operation Details:** The crankshafts are fed into the machine from a loading station which roughly positions the shaft angularly for the first station. An automatic transfer mechanism mounted on a rail located directly above and in line with the machine work heads moves the shafts from station to station. The transfer mechanism has one more traversing unit than there are stations and each traversing unit carries lifting hooks that are electric motor driven in a vertical plane. The traversing units are connected positively in tandem and are spaced to coincide with the spacing of the grinding stations.

At the start, the traversing units rest in the extreme left-hand position with the lifting hooks at the top of their stroke. At the start of the machine cycle the lifting hooks come down simultaneously, pick up a shaft and transfer it to the next station. As the lifting hooks start back to their rest position the shafts deposited in the work holders are automatically indexed angularly and longitudinally and are automatically clamped and ground. Work size is automatically controlled by gages at the grinding position which terminate the cycle when crankpin diameters have been reduced to the desired size.

**Automatic Indexing:** Longitudinal indexing or spark-splitting is accomplished by a mechanism attached to the base and in line with the grinding wheel. As the shaft is deposited in the grinding station, the spark-splitting (longitudinal indexing) mechanism engages the side walls of the pin to be ground and guides the shaft in an axial direction so as to align the pin with the grinding wheel. The spark-splitting mechanism is interlocked with the loading mechanism, work clamping, and wheel slide to assure proper sequence of function. The shaft is accurately indexed angularly by the right-hand work holder during the act of clamping, positive location being taken by a pin engaging a reamed hole in the flange or a finished pad on the cheek.

**Flexible Cycle:** The machine cycle is arranged so that any grinding station may be cut off if maintenance work is necessary at the particular station. • •

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# CUT-OFF Wheels . . .

**for Metal and Non-metal**

This complete line of Bullard Resinoid Bonded wheels offers a choice of many sizes and styles for all kinds of cutting jobs. They're strong, have high resistance to breakage and a low wear ratio. Made by the specialty manufacturers of cut-off wheels for over 25 years.

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SPECIALTY MANUFACTURERS OF RESINOID BONDED HIGH SPEED GRINDING CUT-OFF AND COPING WHEELS

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## GILMORE DIAMOND TOOLS

**A Tool for Every Purpose**

Their successful performance is based upon carefully executing the small but important details involved in the construction of each diamond tool—thus assuring precision and economies.

From a variety of diamond tools in stock, grinding wheels can be formed to do your work, including jobs involving complicated outline.

Diamonds are set in a variety of arrangements to accommodate every need—single and multiple or cluster tools.

*For complete information write for illustrated catalog. No. 45.*

**F. F. GILMORE & CO.**

**OVER 30 YEARS OF DEPENDABLE DIAMOND SERVICE**

**725 Boylston St., BOSTON** **KE 6-2368**

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# PRODUCTION ENGINEERING SHOW

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**GRINDING WHEEL DRESSERS**

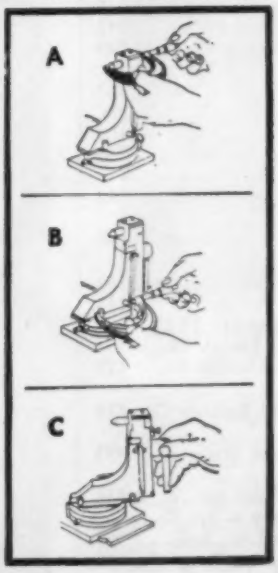
# forms wheels to shape easy as ABC

**ON INTERNAL • CYLINDRICAL & SURFACE GRINDERS • TOOL AND CUTTER GRINDERS**

This is the only radii and angle Wheel Dresser that will accomplish the form dressing of 2 angles, 2 radii and one flat tangent in one setting. It comes in several models to form dress wheels ranging from the smallest sizes to those of 24" in diameter.

Fully adjustable, adaptable and semi-automatic in operation, the FLUID-MOTION Wheel Dresser is the only one requiring only a micrometer for setting to obtain any desired form.

Representatives in principal areas of the U.S.




*A. Measure over diamond point to back of micrometer plate.*

*B. Add required convex radius or subtract required concave radius.*

*C. Tighten gib. Dresser ready for action.*

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**880 DORSA AVE.**
**LIVINGSTON, NEW JERSEY**

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## Cushman to Introduce Four New Products . . . 419, 420, 421

**NAVY PIER**

**The Cushman Chuck Company**
**Hartford, Conn.**

1. The Cushman Accra-Set Chuck (patent applied for) has been especially designed for minute accuracy which must be held to closer limits than possible with the standard scroll type chucks. Adjustment is simple, quick and the chuck will repeat to .0005 in. or better total indicator reading. Because of its extreme accuracy and jaw capacity, the Accra-Set Chuck can replace even the most accurate collet chuck and its necessary range of collets.
2. Cushman has improved and simplified the jaw adjustment of air operated Screw Adjustable Jaw Chucks. The new design permits a quick adjustment with complete elimination of backlash, and provides a positive lock in either direction of holding. Furthermore, it is now possible to lock the jaw assembly without any tendency for top jaw creep.
3. Manually Operated Chuck line has been expanded by adding a 3-Jaw, Scroll Operated, Compensating Chuck. Design of this chuck provides an appreciable amount of compensation and permits gripping of irregularly shaped workpieces which have been previously centered by some other medium than the chuck.
4. The advance design of the new Cushman Air Operated Compensating Chuck offers the user two distinct and important chucking advantages in one chuck body. Not only does this chuck offer far greater compensating action than ever before possible, but also by "locking-out" the compensating action and after being trued up on a spindle, this workholding device can be used as an ordinary self-centering air operated chuck.

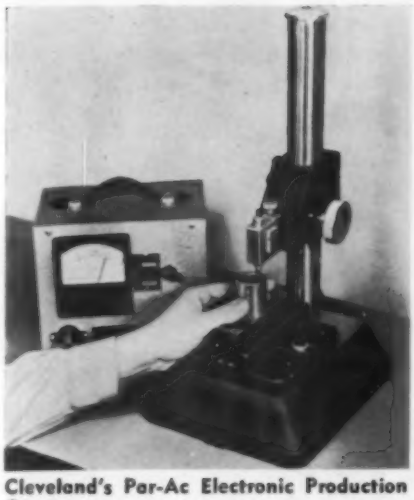
Compensating action is accomplished by means of a lever cage, free to float in any direction and into which are pinned the jaw operating levers. Controlling or locking-out compensation is achieved through the use of three adjusting screws located in the periphery of the chuck body. These screws, depending upon how they are set, either permit or prevent lever cage motion, creating controlled compensation or self-centering chuck operation.

## Cleveland Instrument Shows Precision Instruments . . . 817

**NAVY PIER**

**Cleveland Instrument Co.,**
**Cleveland, Ohio**

1. New Products to be shown include: Opposed Head Micro-Ac Electronic Microcomparator and Autosort Electronic Gaging and Sorting Unit.
2. Other products: Indi-Ac Electronic-



**Cleveland's Par-Ac Electronic Production Gage.**

Indicator; Par-Ac Electronic Production Gage; Micro-Ac Electronic Microcomparator.

## Micrometrical Surface Measuring Instruments . . . 651A

NAVY PIER

**Micrometrical Mfg. Co., Ann Arbor, Mich.**

1. Proficorder—A stylus-type tracing instrument which provides a true magnified profile of a surface on a permanent chart record. The instrument consists of three basic parts: the Tracer, Pilotor and Amplicorder.
2. Other Products: Profilometer, instrument for measuring surface roughness; Anderometer, shop instrument for measuring waviness of assembled bearing; Wavometer, shop instrument for measurement and control of waviness on small symmetrical surfaces of rotation.

## New Materials Featured by Oakite . . . 562

NAVY PIER

**Oakite Products, Inc., New York, N.Y.**

1. A new material designed to strip zinc chromate primer from aluminum; a new acidic barrel finishing compound; and an alkaline derusting and heat scale removing compound will be featured by Oakite.

## Aerators . . . 448

NAVY PIER

**Melard Mfg. Co., N.Y., N.Y.**

1. The Mel-O-Flo Coolant Aerator connects directly to the coolant line and mixes atmospheric air with coolant resulting in a Non-Splash, Aerated mixture that clings to work and tools.

The new No. 700 and No. 800 series Coolant Aerators operate at pressures as low as 2 p.s.i., making them ideal for installations using centrifugal pumps. The No. 800 series delivers twice as much coolant as the No. 700 series.

**DoAll's D-8 Surface Grinder performing a Crushtruing operation.**

## DoAll at Navy Pier . . . 407 and at Coliseum Shows

**DoAll Co., Des Plaines, Ill.**

1. Versatility of the Surface Grinder will be shown in a variety of demonstrations at the Coliseum Machinery Show and at the MACHINERAMA in Des Plaines. Form grinding demonstrations will be conducted on new DoAll completely Automatic Grinders which incorporate automatic downfeed as well as automatic crossfeed and crossfeed reverse. Visitors will witness a demonstration of the form dressing or shaping of grinding wheels and the subsequent reproduction of this form directly in the work.

A corollary grinding demonstration at the company's Des Plaines plant will deal with slicing and dicing of germanium—the expensive crystalline metal used in transistors. The highly brittle nature of this material makes it particularly subject to fracturing and breaking with the slightest vibration or bounce. Extreme stability and rigidity of DoAll grinder construction will be shown by smooth, efficient and productive performance on this material.

2. Occupying a prominent location at Chicago's Navy Pier will be a 36 foot display based on DoAll's famed travelling exhibit "Civilization through Tools". This self-explanatory display depicts, in broad detail, the gradual development of man with the tools man has actually used down through the ages.
3. Also: Gage Blocks; Gages; Cutting tools and industrial supplies.
4. At the Coliseum Show DoAll will demonstrate their Automatic Power Saw.
5. A special exhibit at the DoAll plant, Des Plaines, Ill., will feature a machine tool and gaging clinic: MACHINERAMA. Transportation will be provided.

---

2. Melard is also manufacturing fan nozzles to adapt to their Coolant Aerators. These fan nozzles are particularly useful on grinders. Flexible hoses are also available for use both with and without the fan nozzles in lengths from 6" to 24".

The Mel-O-Flo Coolant Aerator incorporates a self-cleaning mechanism that purges the Aerator of dirt or chips whenever the coolant supply is interrupted. Aerated coolant clings to the work and tools, reducing centrifugal throwoff and providing superior wetting action and heat dissipation, which results in better cooling, longer tool life, and increased production.

## Vapor Blast's "Junior" Liquid Honing Model . . . 469

NAVY PIER

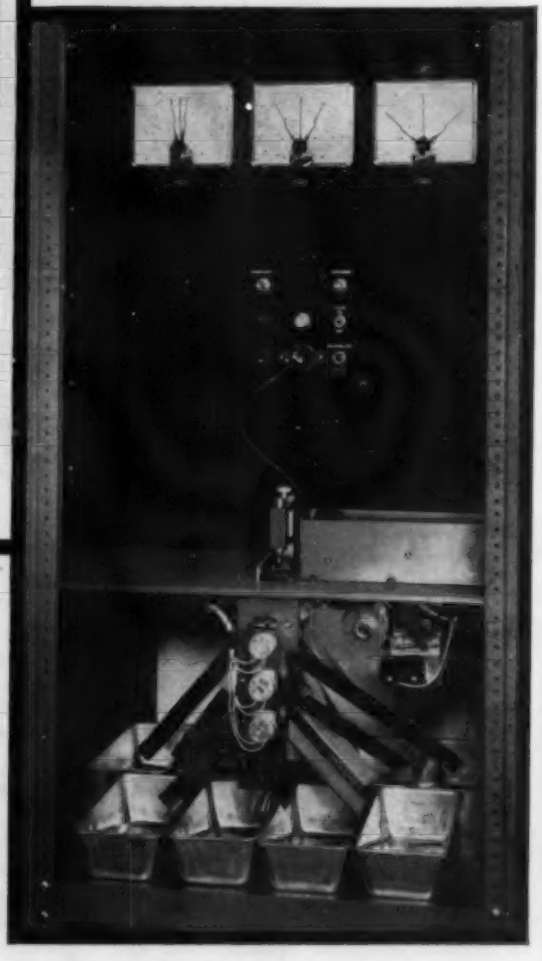
**Vapor Blast Mfg. Company, Milwaukee, Wis.**

1. Designated as VB Junior Model 1818, the new machine is capable of

# NEW!

## Cleveland AUTOSORT Model 101

● For automatic gaging and sorting of parts up to 3" length and ¾" OD at speeds of 3,000 per hour or faster



**CHECKS** length, OD, thickness, or any other external dimension.

**SORTS** into as many as 5 specific size categories plus oversize and undersize — within any range from .0002" to .010" as ordered — by increments as small as .000050", depending on the range.

**ADAPTABLE.** Furnished to meet individual requirements as to size and shape of work, dimension measured, and number of size categories — and to accommodate any desired means for loading and discharge.

**FREE BULLETIN 551** gives details. May we send you a copy? Write —

**CLEVELAND INSTRUMENT COMPANY**
**735-5 CARNEGIE AVE. • CLEVELAND 15, OHIO**

**Cleveland** ELECTRONIC GAGING EQUIPMENT

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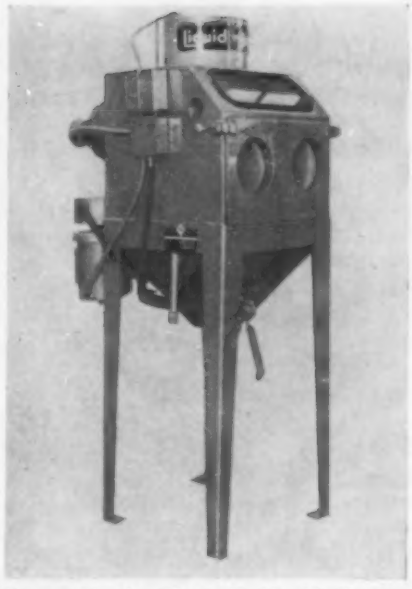


**Vapor Blast's "Junior" Liquid Honing Model.**

performing most of the tasks of larger machines—cleaning, surface finishing, descaling, fine deburring, honing tools, finishing any small parts that can be inserted through the loading door which is 15½" x 9".

The new VB Junior Model 1818 is completely self-contained, requiring only water, air, power and exhaust connections. Designed for use in toolroom, machine shop, laboratory, or small parts production lines, it requires air source of only 15 to 20 c.f.m. at up to 90 p.s.i. (approx. 5 hp.) usually available in most plants. It is equipped with a special design re-circulating slurry pump with 1/3 hp. motor, filtered exhaust fan and motor, noncorrosive removable filter, VB abrasive gun with attached air valve control (this gun can be used as aspirating gun where lower efficiency is permissible or desired), flexible hoses, observation window, fluorescent light, knee-operated window washer, removable loading table, push button starting, hopper with drain.

## The Industrial Diamond Association of America . . . 139

**NAVY PIER**

**Industrial Diamond Association of America, Inc.; N.Y., N.Y.**

1. Featured will be illustrations of various manufacturing processes which depend upon industrial diamond tools and products. There will also be a limited exhibition showing the various types of diamond tools and products, and the distribution of I.D.A.'s increasingly popular illustrated papers on their best and most up-to-date use and care.
2. A feature of I.D.A.'s exhibition will be the display of diamonds as mined. The Association will exhibit extensive

series of industrial diamonds of many sizes and types, suitably described, and also illustrations of diamond mining, as well as exact replicas of world-famous gem diamonds of history.

### Horton Chuck's New Centering Device . . . 836

NAVY PIER

**Horton Chuck Div. of the E. Horton & Son Co., Windsor Locks, Conn.**

1. A new centering device is specially designed to be incorporated in their line of J-Type chucks used in machining jet engine parts.

This new and exclusive Controlled Centering Pressure Chuck has the advantage of being able to center at a pre-set centering pressure thin-walled rings and parts without distorting them during the centering process.

The 3 universal jaws moved in toward the workpiece, stop automatically when all three jaws come in contact with the piece. The 12 independent jaws are then moved in to pinch the part in its "as is" position.

This adjustable centering pressure feature eliminates the possibility of distortion to the part due to excess pressure applied by the operator.
2. Also featured Horton "Tru-Set" Chuck with a guaranteed accuracy of .0002" T.I.R. and the Horton "Windsor" line of independent and universal chucks, are packed in reusable airtight metal containers.

# COLISEUM MACHINERY SHOW

## *List of Exhibitors*

American Herforder Corp.
American Positive Grip Vise Corp.
American Pullmax Co., Inc.
Armstrong Brothers Tool Co.
Atlas Press Co.
Baird Machine Co.
Bansbach Machinery Co.
Black Drill Co.
Boice-Crane Co.
Burg Tool Mfg. Co., Inc.
Cincinnati Mfg. Corp.
Commander Mfg. Co.
Crystal Lake Machine Sales Corp.
A. P. de Sanno & Son, Inc. Machinery Division
DoAll Company
Easco Products
East Chicago Mach. Tool Corp.
Electro Arc Sales Co.
Fawick Airflex Div. Fawick Corporation
Fenn Manufacturing Co.
Fenway Mach. Sales Co., Inc.
Fulmer-Hone Company
James W. George Mchy. Co.
Graham Machine Tool Co.
Grand Specialties Co.
Hammond Machinery Builders, Inc.
Hydra-Feed Mach. Tool Corp.
Jiffy Tool Supply Co., Inc.
Kling Bros. Eng. Works
Lake Shore Engineering Co.
K. O. Lee Co.
M.B.I. Export & Import, Ltd.
Machinery Dealers National Ass'n.
Manning, Maxwell & Moore, Inc. Shaw-Box Crane & Hoist Div.
Maserati Corp. of America
Mead Specialties Co.
Metal Removal Co.
Neff, Kohlbusch & Bissell, Inc.
Nicholas Equipment Co.
Nord International Corp.
O'Neil-Irwin Mfg. Co.
Pangborn Corp.
Portage Double-Quick Tool Co.
Portage Machine Co.
Production Machine Co.
Reeves Pulley Co.
Geo. T. Schmidt, Inc.
Sealol Corporation
Service Machine Co.
Sheldon Machine Co., Inc.
Simplex Machine Tool Corp.
Skil Corp.
Sleeper & Hartley, Inc.
South Bend Lathe Works
U.S. Burke Machine Tool Div.
Walker-Turner Div. Kearney & Trecker Corp.
Wells Manufacturing Corp.
Zagar Tool Inc.

### Hammond's Carbide Grinders 214

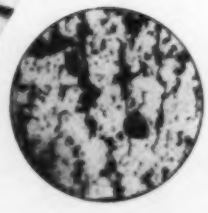
COLISEUM

**Hammond Machinery Builders, Inc. Kalamazoo, Mich.**

1. The new Hammond Model CM-6 Carbide Chip Breaker Grinder is available as either Bench or Floor Model and either with or without a cup wheel arrangement. Interesting features are: ½ hp drive motor delivers adequate power for medium duty requirements; accommodates a 6 in. diameter chip breaker wheel, and cup wheel arrangement, when furnished, accommodates a 6 in. diameter cup wheel; any-angle vise with 4 swivel adjustments furnished on the chip breaker end provides for all angular settings and accommodates tools up to 2 in.; vertical and horizontal movements on the chip breaker end are calibrated to .001 in.; a large drip feed tank for each end of the Grinder supplies an ample drip of coolant to keep the diamond wheels clean and free cutting; work table on the cup wheel side adjusts from 30° above to 30° below horizontal. Table moves "in and out" from wheel by screw feed.
2. The Model CBW-6 is designed principally for heavy-duty steady production chip breaker grinding, but can also be furnished with a cup wheel arrangement if desired. It is designed for use in those plants where large quantities of tools are ground and is built for use on both a precision and production basis. Interesting features: ½ hp or 1 hp drive motor delivers adequate power through V-belt drive; chip breaker end accommodates 6 in. diameter wheel and cup wheel end uses 6 in. diameter cup wheel; any-angle vise with 4 swivel adjustments furnished on the chip breaker end provides for all angular settings and accommodates tools up to 2 in.; table assembly on chip breaker end reciprocates on ball bearing ways and length of stroke is adjustable; vertical and horizontal movements of the table assembly on the chip breaker end are calibrated to .001 in.; self-contained pump and tank unit with special splash guarding provides a flood of coolant; special spindle bearing arrangement eliminates any end play on spindle;

**Hammond Model CM-6 Chip Breaker & Diamond Finishing Grinder.**

# select most practical
# coolant cleaning



Composite swarf from wet O.D. grinder — magnified 60 diameters.

## USE BARNESDRIL LABORATORY RESEARCH

Composite steel swarf from super-finish grinder — magnified 60 diameters.

To help you get production efficiency in the use of coolants, BarnesdriL maintains complete laboratory facilities for testing samples of contaminated coolants and other industrial fluids. From these tests, the characteristics and quantity of contaminants can easily be determined, and studied for recommendation as to the best possible method for efficient removal.

Composite honing swarf — magnified 60 diameters.

*When you have coolant purification problems send them to BarnesdriL Engineers.*

COOLANT BARNESDRIL CLEANING

**FILTRATION DIVISION**
**BARNES DRILL CO.**
878 CHESTNUT STREET • ROCKFORD, ILLINOIS

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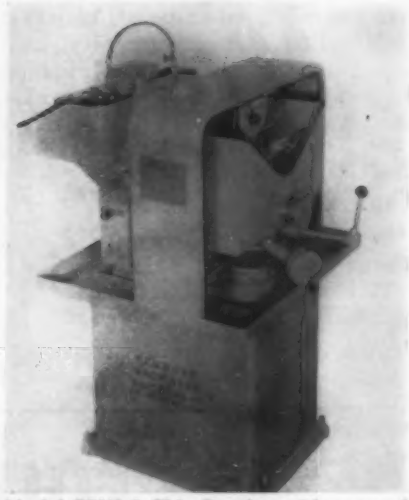


**Model CBW-6 Chip Breaker with cup end wheel.**

work table on cup wheel end, when furnished, adjusts to 15° above and 30° below horizontal. Table surface is fitted with precision ground reversible, replaceable wear plates.

### K. O. Lee's B943 Motor Driven Work Head .....554

**COLISEUM**

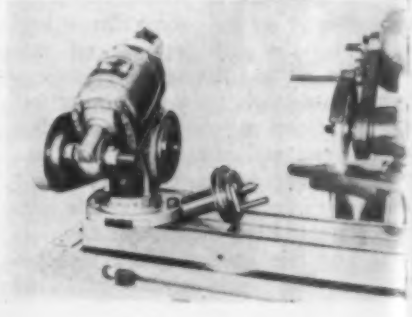
**K. O. Lee Co., Aberdeen, So. Dakota**

1. The B943 motor driven workhead is a compact, self-contained power unit for internal and external grinding. It is held in position by two T-slot bolts and can be mounted at any convenient spot on the table. The swivel base, which is graduated 90° one side of center and 45° on the other, permits the workhead to swivel full 360° if desired.

The No. 11 B & S tapered spindle mounted on ball bearings, is hardened and ground and is designed to receive chucks, collet fixtures, face plates, straight or tapered sleeves, centers and like equipment, also available with No. 12 B & S and No. 25 Morse. Streamlined in design, this fixture is quickly mounted and is easy for the operator to keep clean.

2. Complete line of tool grinders, carbide and chip breaker grinders. New fixtures include the B942 Sensitive Work Head, B947 Tap Grinding Fixture and the B992 Sensitive Work Head.

**Lee's B943 motor driven workhead.**



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| 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
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| 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | | | | |
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## de Sanno's Abrasive Cut-off Machine, Grinding Wheels . . . 311

**COLISEUM**

**A. P. de Sanno & Son, Inc., Phoenixville, Pa.**

1. Radiac Type "JH" Wet Cutting Abrasive Cut-off Machine with a hydraulically driven cutting head is sturdily built to eliminate vibration. The machine is arranged for both hydraulic and manual operation of the cutting head. Radiac Type "JH" operates an 18" diameter abrasive cut-off blade, driven by seven V-belts and a 10 hp ball bearing motor. The motor is controlled by a magnetic starter with a remote push-button station.

The coolant is supplied from a storage tank and pump, located within the base of the machine, and is directed with three jets on the cutting abrasive blade and work at the point of cutting. The coolant pump motor is operated by a separate manual starter.
2. Also: Type N16 Abrasive Cut-off Machine; Por-O-Bor Grinding Wheel for carbide grinding; general line of grinding wheels. • •


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## Maserati to Show Blohm Horizontal Surface Grinder . . . 642

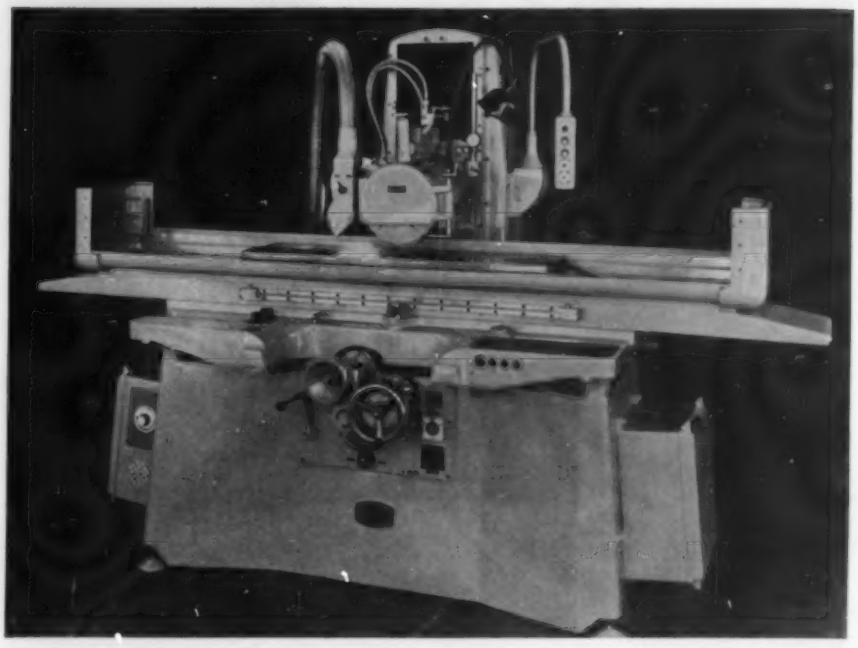
**COLISEUM**

**Maserati Corp. of America, Westbury, N.Y.**

1. In this Blohm Surface Grinder the cross movement is performed by the table. Saddle and table are carried on ball bearing assemblies operating on hardened, precision ground chromium-nickel steel ways. The 5 hp motor mounted directly on the spindle works on adjustable tapered bronze bushings with pressure lubrication. Wheels up to 4″ in width can be used in conjunction with a cross feed up to 2½″ per stroke. These table and spindle features are claimed to practically eliminate vibration and help insure maximum concentricity.

The Microtip in-feed and depth-feed control permits accuracy of adjustment control and speeds up the operator's work. After a rough hand adjustment the Microtip gives push-button automatic adjustment to provide a cross feed of .0002″ and a depth of .00004″.

The Finimatic device (optional) permits the operator to set the job and let the machine carry out the complete grinding cycle. The machine stops itself after three idle runs to allow it to cool off.

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**Exact and Vibrationless**
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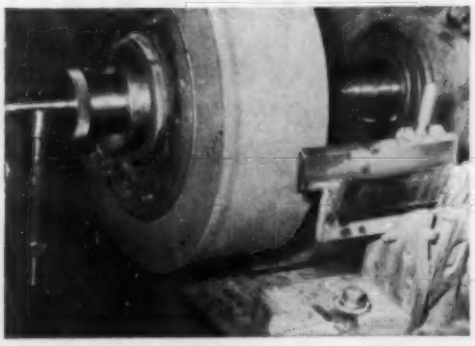
**with—DRIVER BALANCING EQUIPMENT**



- A sensitive Ball Bearing Arbor attaches to and becomes an extension of the spindle.
- Grinding wheel is moved onto the Arbor without removing it from the machine.
- LARGE WHEELS, CENTERLESS WHEELS, SMALL WHEELS they are all easy to handle with Driver Balancing Units.
- Saves up to 80% of time and labor on every Balancing operation.
- Portable and Bench model Units are made for most every kind of grinder.
- Low in Cost—Easy to operate—performance Guaranteed.

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**210 Paramount Building Fort Wayne, Ind.**

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this *New Model* SUPER TWIN is a boon to every plant with the problem of tumbling many various sized loads.
3 different sized barrels—5 gal., 1.1 cu. ft., and 2 cu. ft. are tumbled at one time by a ¾ H.P. motor through a variable speed drive.

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**RAMPE MANUFACTURING CO.**
**14915 Woodworth Ave. Cleveland 10, Ohio**

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# NEW

# BRYANT air sizing . . .

Bryant #2209-Y Automatic Internal Grinder equipped with Bryant Air Sizing for automatic size control of bores

Be sure to see Bryant at the Machine Tool Show, *Booth 1015*

## holds closer tolerances in internal grinding than any other sizing method!

This new method of sizing is designed especially for automatic production. It's extremely accurate, time-saving and economical—ideal for straight hole grinding when high-speed production, close tolerances and fine finishes are desired.

Bryant Air Sizing utilizes three principal operating components: Air Gage Panel, Bryant Impulse Timer and the Air Plug.

The Air Plug is mounted through the workhead and traverses continuously into the workpiece during the finish grinding cycle. Oscillation is timed and controlled from the wheelslide.

The Air Gage Panel measures the pressure peaks which occur at the air plug orifices each time the Air Plug enters the workpiece. These pressure peaks are multiplied to make gaging faster and more sensitive, and are then converted from pressure values into electrical impulses which operate the Bryant Impulse Timer.

The Timer continues the grinding cycle until the impulse signals stop, indicating that size has been reached. It then stops the grinding cycle and initiates the automatic loading cycle.

Bryant Air Sizing controls the size of workpieces *during the finish grinding cycle.* There is no contact between the gaging element and the workpiece. As a result, wear of the gaging element and possible scoring of the workpiece is eliminated.

Diamond sizing is used with Bryant Air Sizing to control size during the rough grind operation. *Write for descriptive literature.*

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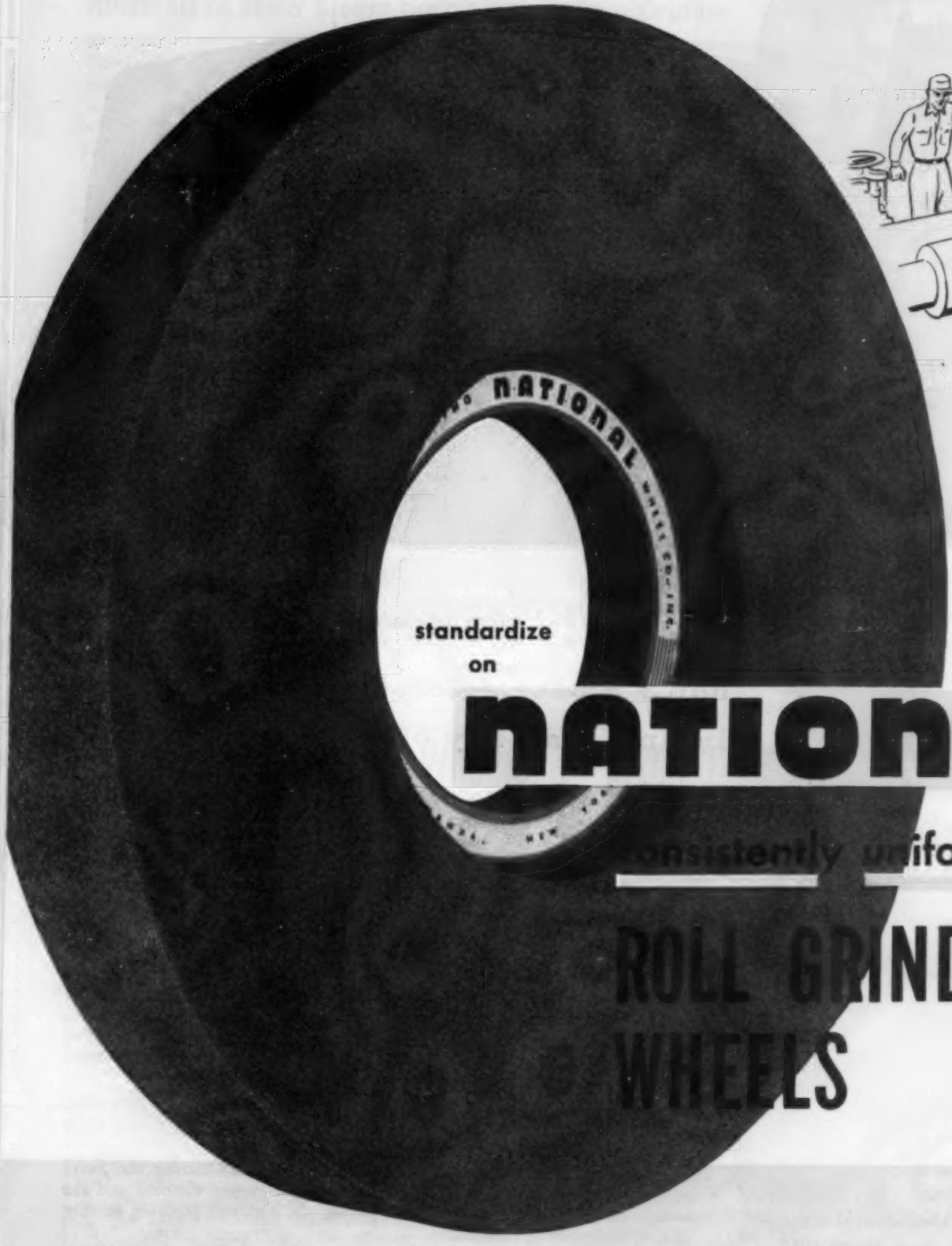


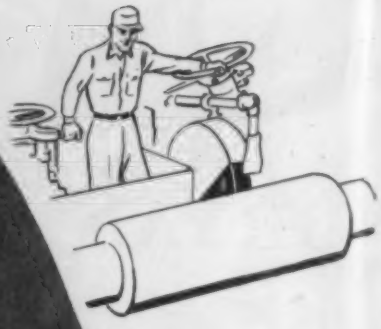

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**NATIONAL GRINDING WHEEL CO., INC.** NORTH TONAWANDA, N. Y.

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## Raytheon's Impact Grinder .....111

COLISEUM

**Raytheon Mfg. Co., Waltham, Mass.**

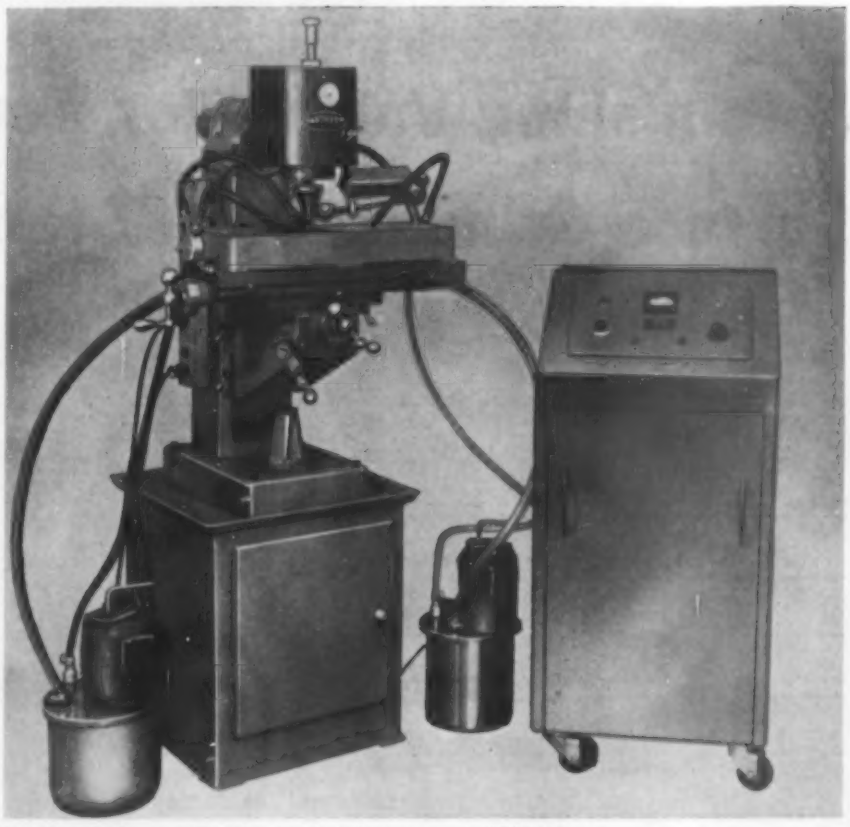
1. Coincident with the introduction of a new series of models, the name of the Raytheon Ultrasonic Machine Tool is changed to Raytheon Impact Grinder. The new name is more descriptive of the actual cutting action.

Cutting is accomplished by tiny particles of abrasive accelerated by a vibrating cutting tool and driven with tremendous impact against the work. The new name "Impact Grinder" describes this action.

The series has two models: Model 2-332-1 employs a single abrasive circulating unit; Model 2-332-2 has a dual abrasive unit making two different grit sizes continuously available on the machine. Roughing and finishing grit sizes, for example, are both immediately available without risk of intermixing the two abrasives and without having to drain and flush the unit.

These models shape the hardest of materials, many soft ones, and perform best on the most brittle. They are able to form intricate shapes in carbides, ceramics, quartz, plaster of paris, stellite, hardened steel, glass and others to tolerances of $\pm 0.0002$ in. with finishes of eight microinches or less.

2. Also: Electronic Duplicators.



Raytheon's Impact Grinder holds tolerances of .0002 in.

## Graham To Show Astra Surface Grinder .....921

COLISEUM

**Graham Machine Tool Co., N.Y., N.Y.**

1. The 10 in. x 24 in. Astra Hydraulic Surface Grinder has been designed and built to fill the need for a grinder with ample grinding width and fully hydraulic movements, standard and rapid traverse feeds.

The spindle is mounted in precision roller, ball and thrust bearings, assuring maximum strength and rigidity. The spindle is driven by a carefully balanced 2 H.P. motor in a vibration absorbing mount.

2. Also to be shown: Milling Machines.

## Crystal Lake Features Precision Grinders .....656

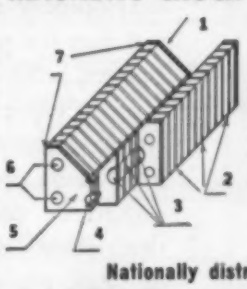
COLISEUM

**Crystal Lake Machine Sales Corp., Crystal Lake, Ill.**

1. No. 816 Universal Grinder; No. 612 Surface Grinder designed for grinding of Jo Blocks and Carbide form grinding; No. 750 Plain Grinder equipped with new by-pass filtering system, General Electric Thymotrol drive.


SPEED UP YOUR GRINDING SET-UPS

MAGNETIC CHUCK PARALLELS and "V" BLOCKS

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(Write for complete construction features).

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| 1x2x2 | $16.50 |
| 1x2x3 | 19.50 |
| 1x2x4 | 22.50 |

Patent Pending

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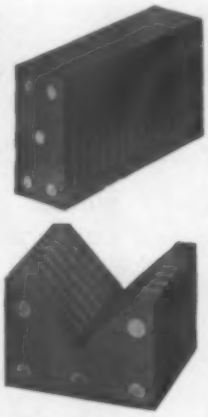
| 1¾x2½x2 | $22.50 |
| 1¾x2½x3 | $33.75 |
| 1¾x2½x4 | $45.00 |



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# Establishing Values For Vertical Spindle Surface Grinding With Standard Data ...Part 4

By **E. A. Cyrol,** president
E. A. Cyrol & Co.,
Management Consultants,
Chicago, Ill.

## Standard Data Will:

- ✓ provide good production standards
- ✓ eliminate misunderstanding between management and union
- ✓ establish standards on short run production
- ✓ eventually ease lengthy time studies
- ✓ increase effectiveness of wage incentive programs

This is the fourth part of a series of articles by E. A. Cyrol covering the development and use of standard data for grinding operations.

Mr. Cyrol is a well-known author in the technical field. He is the author of "Standard Data for Turret Lathes and Hand Screw Machines," and has written extensively for magazines in the machine tool industry.

THIS is the fourth in a series of articles on the development and use of time standards from standard data for grinding operations. As in the previous articles, actual data for setting production standards is presented. However, the data should be thoroughly checked particularly toward the extremes and the area where the majority of the work falls. The data should be considered as a guide until elemental descriptions and values have been checked, as individual plant policy, material handling, types of parts, material, tooling, tolerances, and gauging equipment all could have an effect on certain elemental values.

Although it is outside the scope of this article, the proper wheel selection is so necessary for optimum operations that it is suggested that reference be made to Blanchard's recommendations for wheel selection.

### How to Use the Standard Data Work Sheet

A standard is set for a particular method and incorporating certain feeds, speeds and stock removal. The heading of the work sheet is a part of the record of the method used and contains information needed for determining the standard. The heading should, therefore, be filled in completely.

## BLANCHARD GRINDER STANDARD DATA WORK SHEET

| | | | |
|---|---|---|---|
| Date | Tol. & Finish | Grinding Area/Pc. | Part No. |
| Grinding Wheel | Chuck Speed | Pcs./Load | Part Name |
| | Feed In./Min. | Total Area | Oper. No. |
| | Stock Removal | Mat. | Dept. |
| TABLE I | Wheel Wear Allow. | Pc. Wt. | Mach. No. |

| Wt./ Pc. | Floor to Fl. | Table to Tab. | Element Description | Min./ Occur | Occur | Total Min. |
|---|---|---|---|---|---|---|
| 1 | .074 | .044 | Load and Unload - Floor to Floor (Table I) | | | |
| 2 | .078 | .047 | Table to Table (Table I) | | | |
| 3 | .082 | .051 | Hoist | .940 | | |
| 4 | .086 | .054 | Fixture | | | |
| 5 | .090 | .058 | Clamp and Unclamp - Cam or Spring Lever Lock | .047 | | |
| 6 | .094 | .061 | - Hex Nut & Washer with Wrench | .238 | | |
| 7 | .098 | .065 | - Star Wheel and Strap | .068 | | |
| 8 | .102 | .068 | - Bar On and Off | .083 | | |
| 9 | .106 | .072 | | | | |
| 10 | .110 | .075 | Index Fixture | | | |
| 12 | .118 | .082 | Position Chuck Under Wheel | .300 | | |
| 15 | .130 | .093 | Grind $\frac{\text{(T. Stock + Wheel Allow.)}}{\text{(Feed/Min.)}}$ | - | - | |
| 20 | .150 | .110 | Grind - No Feed - .052 + Min. Per 3 Rev. of Table* | | | |
| 25 | .170 | .128 | Feed Out to Check | .110 | | |
| 30 | .190 | .145 | Check | .140 | | |
| 35 | .210 | .163 | Reposition Chuck Under Grinding Wheel | .180 | | |
| 40 | .230 | .180 | Wash Work | .350 | | |
| 45 | .250 | .198 | Clean Chuck | .310 | | |
| 50 | .270 | .215 | | | | |

* To Obtain 62 RMS, Add 10 Rev.
32 " " 20 "
16 " " 30 "

Std.Min./Pc.___ Std.Hrs./Pc.___ Pc./Hr.___

| | |
|---|---|
| Total Cycle Time/Load | |
| Plus _____% Allowance | |
| Total Allowed Time/Load | |
| 20% Incentive Factor | |
| Total Standard Min./Load | |

The feed is determined from Chart I. In that there are several additional variables other than those shown in the Chart, one of the following adjustments may be needed:

(a) To obtain a fine finish and a flatness tolerance of .0003 or better, decrease the feed up to ½ of that given in the table.

(b) When the part is difficult to hold or the ratio of linear inches of edges to the square inches of surface being ground goes above 3:1, the feed may be decreased slightly but the table speed can be kept up at the rpm that would have corresponded with the higher feed.

(c) Higher feeds may be used when the grinding wheel has a 46 grain size or coarser.

The basic table speed can be considered as that speed which will produce .001 inches feed per revolution for the basic feed (Chart No. 1), i.e. if the feed were .020 inches per minute, the table rpm should be 20. Adjustment may be needed for one of the following conditions:

(a) To improve finish when using coarse grain wheels, use about ½ the above table speed.

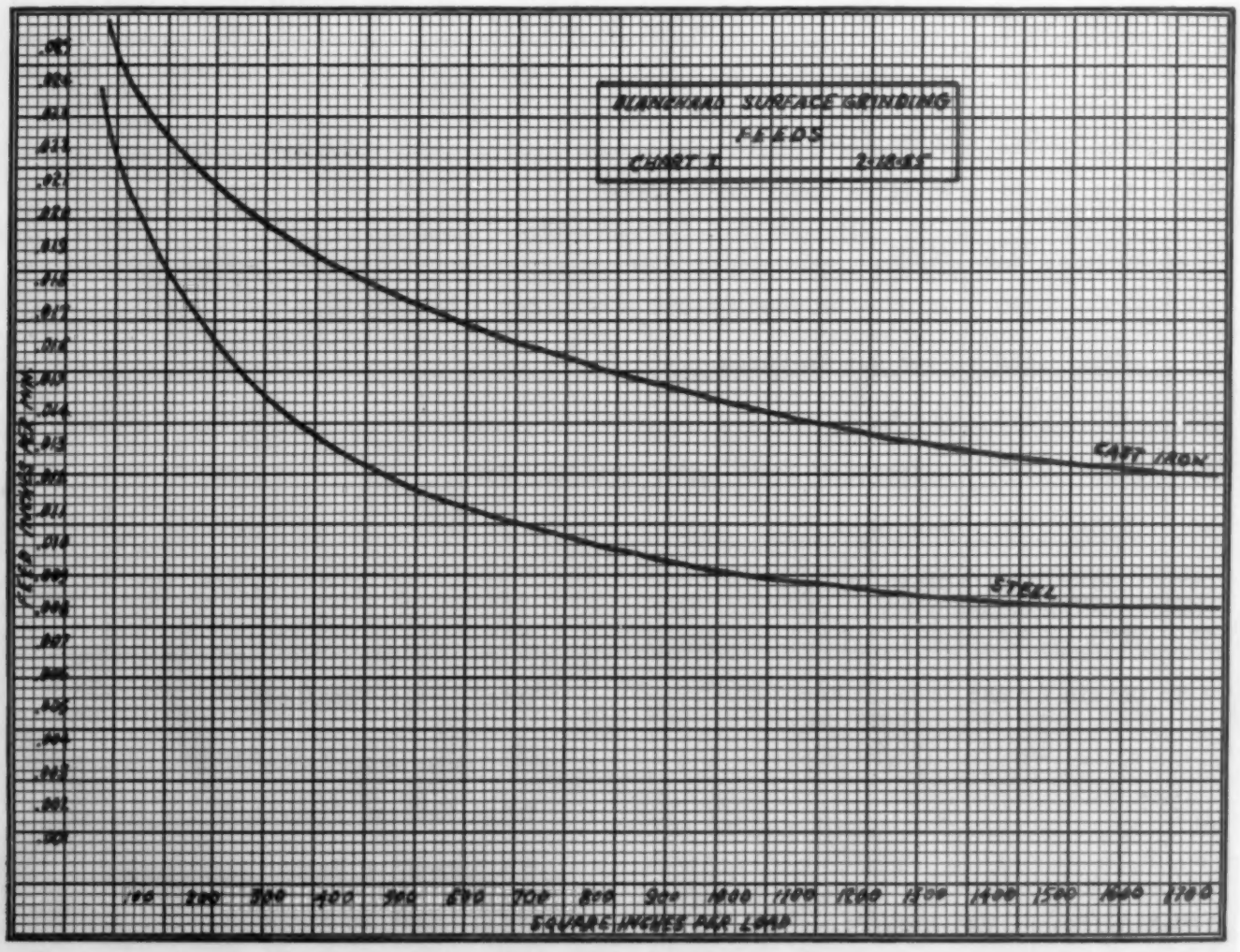
(b) To improve the finish when using fine grain wheels, use the highest table speed (to eliminate heating of the work).

An additional cross reference may be made to the range of values in the following table:

| Material | SFM Range | Max. Cu. In. Removed/Min. |
|---|---|---|
| Hard Steel | 95-170 | 9.50 |
| Soft Steel | 80-300 | 8.50 |
| Cast Iron | 100-200 | 19.00 |

The average SFM is between the mid-point and upper 2/3 of the range. The cubic inches removed per minute is mainly dependent upon the square inches per load, the greater cubic inches being removed for the larger square inches per load.

After completing the heading, the elemental values and occurrences can be determined and extended. The load and unload time per piece can be determined from Table I. If the weight goes above 50 lbs., use the value for the hoist. Fill in



the number of occurrences; in this case it is the quantity of pieces per load. Multiply the value by the occurrences to obtain the total minutes for the element.

If a fixture is used which requires something other than one of the clamp and unclamp variations listed, a study will be needed. (The data from the study should then be accumulated on the spread sheet for future use.) Note the occurrences adjacent to the value and extend.

If an indexing fixture is used, determine the value and extend by the occurrences.

**The position table under wheel** usually occurs once per load. If a second surface is ground by turning or indexing the piece(s), this element would occur twice. Extend by the occurrences.

The **grinding time** is determined by adding the wheel allowance, usually .05 inches, to the stock removed and dividing by the feed changes in inches per minute.

The **grind - no feed,** spark-out time, is determined by dividing the table rpm into 1.00 minute, multiply by 3, and add .052 minutes. Add the time for an additional 10 revolutions to achieve an RMS of 62, add 20 revolutions for 32 RMS and 30 for 16 RMS.

**Feed out to check** and **check** are constants per occurrence and are usually done once. Extend by the occurrences.

**Reposition table under wheel** is done if more stock removal is required after checking. This can sometimes be eliminated by putting 1 piece which has been ground to the correct size and blued in a load. Grinding the others until the wheel marks appear on the blued piece will bring the balance of the load within a close tolerance. The average length of run, in process gauging equipment, and tolerances may make this vary from once every 10 loads to 2 or 3 times per load.

**Wash work** will generally occur once per load. However, if a second surface for each piece in the load is ground as part of the same operation, a second wash might be required. Extend by the occurrences.

**Clean chuck** is usually done after each load and second surface per load. Extend by the occurrences.

The extended minutes for each element should be totalled. The result is the total cycle time per load.

The production delay allowances should be computed and added to the cycle time to obtain the total allowed time. Typically these allowances per 8 hr. shift will consist of 33 min. for personal and fatigue and 15 min. for unavoidable delays. 48/(480-48) = 11.1% allowance.

A 20% incentive factor is then added to obtain the total standard minutes per load. If wage incentives are not used, this 20% can be considered as an adjustment factor for the production that can be expected under day work conditions. Divide by the pieces per load to obtain standard minutes per piece. Divide this by 60 to obtain standard hours per piece. The reciprocal of this is the pieces per hour.

• •

**Please mention GRINDING and FINISHING when answering advertisements or use the handy Readers Service Card. Additional information on any product advertised or discussed editorially will be quickly forthcoming.**

**NEW 1955 MODEL "SS"**

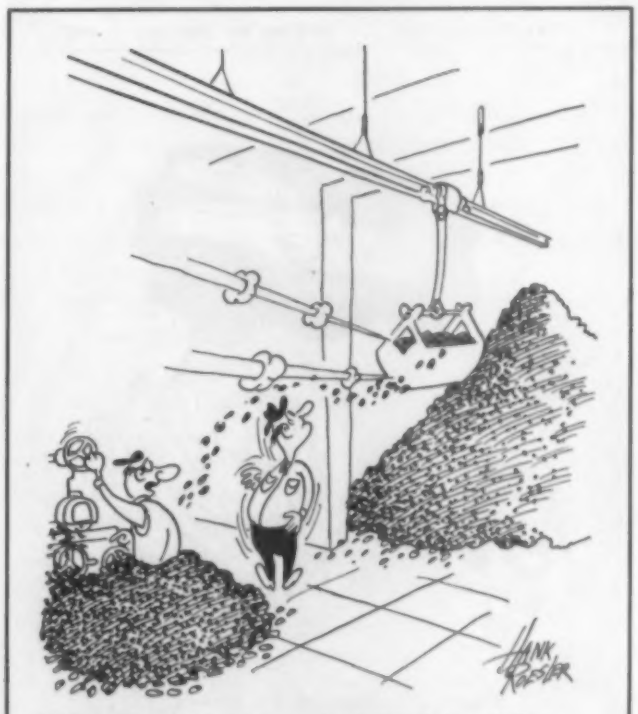
**SOMERSET RADIUS DRESSER**
**outperforms them all**

Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations. Write for free folder and price list.

**At new low price with diamond**
**$124.50**

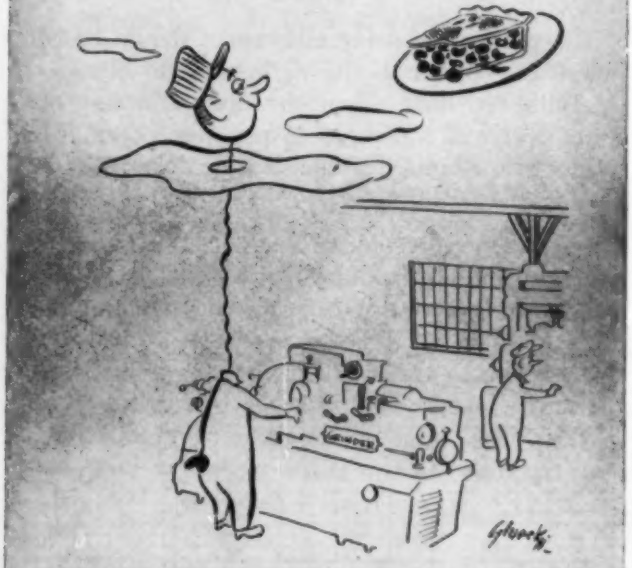
**SOMERSET TOOL CO.**
**2290 Virginia Ave. Hillside, N. J.**

Encircle No. 241 on card, opposite Page 72



"This wrist-watch part is poorly designed for grinding. . . . too much stock to remove!"

A grinding and finishing SAFETY FEATURE



The Daydreamer . . . looking for that pie in the sky. . . .

Discuss the shape of his dreams. . . .

# Men Who Make Accidents Happen . . . and How to Handle Them

## The Daydreamer Can Be A Safe Worker

By **Edmund Mottershead,** President
Mottershead Associates
Chicago, Ill.

● WE ALL indulge in more or less day dreaming from time to time. In fact, advertising men rely on this day dreaming to help them sell the merchandise they write such glowing ads about. But most of us are able to come back to reality sufficiently to concentrate on our jobs and the immediate problems facing us.

Daydreaming on the job is particularly hazardous in grinding operations, because, while manufacturers have built safety into the machines, have provided shields and guards, and have specified the proper speeds and conditions for use of wheels, grinding is still essentially hazardous whenever a worker absent-mindedly forgets to use basic safe and correct job methods. Anything moving at the rpm's and surface speeds of grinding wheels, which is removing metal chips or particles from a piece of work, and which is inherently fragile itself, can be dangerous the moment the worker operates it improperly.

Daydreaming generally takes pretty much the same form, whoever is doing it. There is the expressed determination to have a big, shiny new automobile, a bigger TV set than the neighbors, a college education for the kids, a little chicken farm to retire to, an automatic washer and dryer for the wife. There is the constant comment about how tough things have been but it's not always going to be that way. "I wasn't meant to sweat all my life, and one of these days there'll be the break I've been waiting for." It's not just coincidence that the daydreamers all sound pretty much alike.

They talk alike because they are all motivated by pretty much the same psychological and social

impulses. The daydreamer often is a fellow who, like the rest of us, gets tired of the struggle, but who deludes himself into thinking that the struggle really isn't necessary, that there is some easy way to get along. Because they can't seem to get ahead, they turn to daydreaming about their future. It's really so much easier and so much more pleasant to make rosy plans for the future than it is to work hard today.

What can the foreman do about the daydreamer who is also running a grinder? It doesn't do much good to get tough with such a man, because he will immediately take criticism as just one more evidence that this job isn't good enough for him, one more evidence of the real validity of his pie-in-the-sky.

The first thing to do is to treat such man on a mature level, let him talk from time to time to see what shape his particular dreams take, and then talk a bit about your own kids or your own problems and how you or your children have had to face up to these problems and work hard to achieve success. Point out how we all get discouraged at times but that in the long run things work out with persistent effort and serious attention to the job in hand.

Secondly, ask him to help you solve the number one safety problem in the use of grinders of any kind: the proper use of guards or hoods at all times. Point out to him that operators become impatient (not careless or daydreaming) with the slight inconvenience, often imaginary, that guards cause, and remove them. Show him how this exposes both the operator and other workers to an unnecessary hazard.

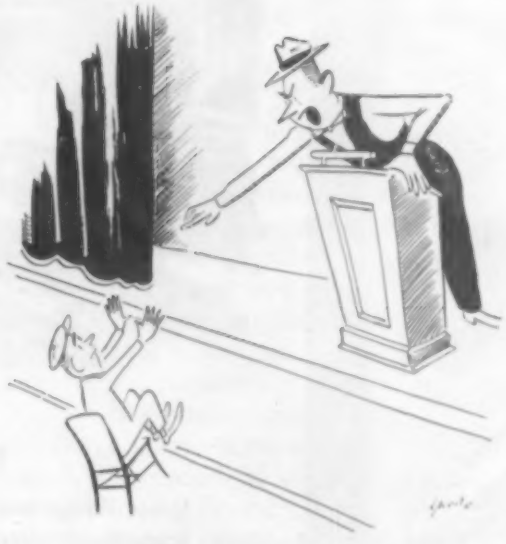
If portable grinders are used in the shop, point out that without a proper guard to protect it, a portable grinder can be dropped or knocked off a workbench, and the wheel is likely to be cracked and subsequently fly apart when the operator resumes work. Also show him that without a guard, in the hands of a careless operator who lays it down before the wheel stops rotating, a portable grinder will jump or travel along the bench or floor, easily leading to wheel breakage or even personal injury.

The majority of daydreamers are nice guys with their minds on everything but their work. The old phrase "asleep at the switch" was invented to describe them.

With a little careful attention from the foreman, they can be made to see that what they want and dream about can only become a reality through hard work. They have to understand that hard work is not hopeless drudgery, but that it involves using your head as well as your back. If they can gain in respect for the job and for the value of human effort, they can regain their own pride and self respect.

Any "lecturing" approach or use of either nagging or "bawling out" is doomed to failure. The daydreamer's problem is psychological rather than logical. Build from the respect they may have for you as foreman. Develop a feeling of mutual understanding and respect on an adult level of appreciating the same problems in life.

**Present him with a formula. . . .**



**Don't lecture. . . .**

Then help the man build slowly his pride in his actual accomplishments. If he can help you solve one of your problems, it gives him a big personal lift and a greater sense of the importance of his own work.

You don't have to be a psychoanalyst to bring about a change such as this in the attitude and work habits of the daydreamers in your shop. What they need primarily is an approach which will snap them out of the optimistic lethargy they have fallen into, and an understanding of their real psychological needs. All it takes is a willingness on the part of the foreman to study his man, exercise patience and understanding, plus a clear realization of the relationship between worker attitudes and safety in the shop. ● ●

RADIUS FORMING TOOLS

"TRU-LINE" PROFILE DRESSING TOOLS

IMPREGNATED DRESSING TOOLS

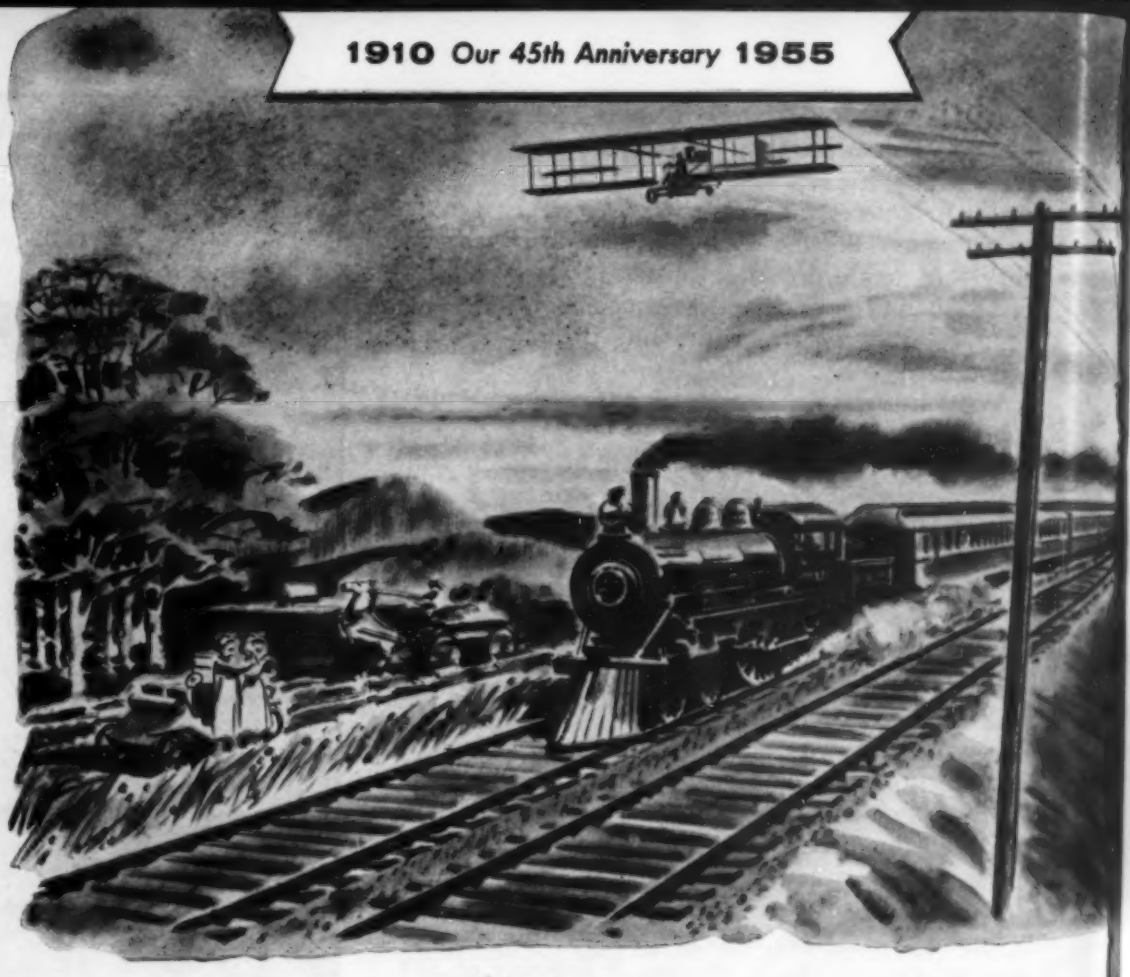
STANDARD DRESSING TOOLS

"TRU-THREAD" THREAD DRESSING TOOLS

DIAMOND GRIT TOOLS FOR THREAD DRESSING

INDUSTRIAL DIAMONDS

**1910** *Our 45th Anniversary* **1955**



# man on the wing

Great things were happening in aviation 45 years ago when we launched the idea of scientifically selected industrial diamonds and set up our little factory to make the diamond tools that were to be so vital to aviation.

Louis Bleriot had won $5,000 offered by London Daily Mail for the first airplane flight across the English Channel. Piloting his 24 H.P., 450 pound monoplane to the dizzy height of 250 feet, he had spanned the 21 miles of open water in 37 minutes. The challenge echoed across the Atlantic and 1910 saw a brilliant parade of dramatic "firsts."

Glenn Curtis won $10,000 offered by New York World in a 150 mile race with a train. Charlie Hamilton won $10,000 offered by New York and Philadelphia newspapers for flying a round trip between those cities in one day. Walt Brookins won $5,000 offered by Atlantic City Aero Club for reaching a height of one mile.

Ely took off from the deck of a cruiser and flew two miles to Norfolk in the first ship take-off flight. Phil Parmalee got $5,000 for flying five bolts of silk from Dayton to Columbus, Ohio, in a store publicity stunt—the first merchandise shipped by air.

*Engineered Diamond Tools** were also a "first" in those early years but their dramatic moment came when war brought critical need for speed and precision in engine production. Then they proved abundantly that nothing cuts like a diamond and that no diamond tool performs like one that is engineered to its job.

**Engineered Diamond Tools* means diamond tools *engineered* to the job and *guaranteed* to do it.

Encircle No. 242 on card, opposite Page 72

**WHEEL TRUEING TOOL COMPANY**

**69-3200 W. DAVISON AVE., DETROIT 38, MICHIGAN**

*ESTABLISHED 1910*

**Southwestern Plant: Dallas, Texas**

***Distributors in Principal U.S. Cities—Agents Throughout the World***

**WHEEL TRUEING TOOL COMPANY OF NEW JERSEY**
**33 West Street, Bloomfield, N. J.**

**WHEEL TRUEING TOOL COMPANY OF CALIFORNIA**
**5560 Alhambra Ave., Los Angeles 32, California**

**WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.**
**575 Langlois Ave., Windsor, Ont.**

# Efficient Roll Grinding Requires: Right Wheel, Proper Machine, A Skillful Operator . . . Part 2

By **William Pope**
National Grinding Wheel Co.
North Tonawanda, N.Y.

### Wheel Truing

- ✓ diamond is most popular for truing and dressing
- ✓ when dressing 30-in. or 36-in. wheels a 2½ to 3½ karat diamond is most economical
- ✓ use generous flow of coolant
- ✓ turn the diamond often
- ✓ diamond must "drag" on the wheel with light cuts not exceeding .001-in. per pass

### Cutting Action

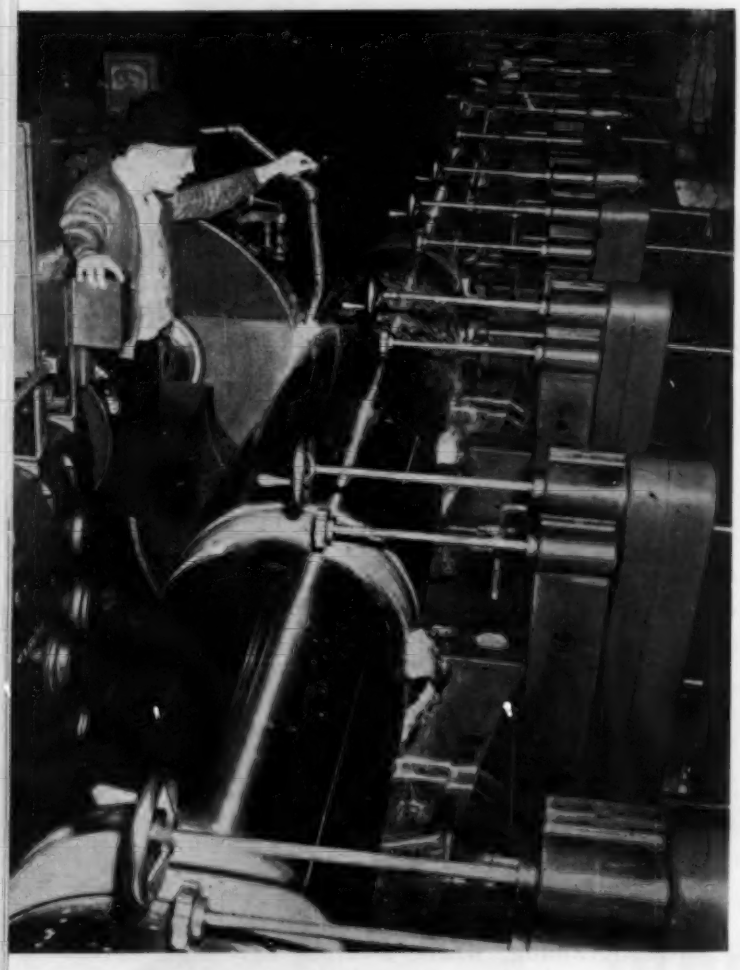
- ✓ cutting action with respect to stock removal of a vitrified bonded wheel improves as the grit is changed from fine to coarse and the grade from hard to soft
- ✓ with resinoid and shellac wheels coarser grit sizes act harder; it is necessary to go softer in grade to obtain best results
- ✓ sometimes it is not advisable to lay too heavy an emphasis on wheel life or rolls ground per wheel

### Wheel Selection

- ✓ many factors influence wheel selection
- ✓ harder grade wheels may be employed to advantage
- ✓ small diameter wheels work better on large diameter rolls

### Wheel Truing and Dressing

WHEEL DRESSING is an important phase of roll-grinding insofar as finish requirements and production is concerned. The dressing tool removes the outside layer of dulled abrasive grains and any metal that the wheel may have picked up, so that new and sharp grains are presented to the work. In this respect, dressing may be considered a sharpening operation. Grinding wheels are usually self-sharpening, but dressing is occasionally required so that the wheel will be fast cutting continuously. For precision grinding, where accuracy and high finish are required, the industrial diamond is still the most popular dressing device, although mechanical dressers are often used on coarse grain wheels used for rough-grinding. When dressing 30-in. and 36-in. diameter wheels, a 2½ to 3½ karat diamond proved the most economical and these were re-set at least three times before they were out. A fast traverse produces a free cutting wheel, while a slow traverse favors a high finish. A generous flow of coolant should be used to wash away the particles of abrasive and bond to prevent the over-heating of the diamond. The diamond should be turned often to present a sharp edge. Frequently a flat spot on the diamond causes it to crack from excess friction heat, which is all the more reason why it should be watched and turned often. It is essential that the trueing tool be set so its center line is slightly below that of the wheel, and is at an angle of 10 to 15 degrees to it, pointing down in the direction of the wheel travel. In other words, the diamond must "drag" on the wheel with light cuts not exceeding .001 per pass. As stated before it is important that the diamond is turned on its axis from time to time to present a new sharp edge and allow the diamond to sharpen itself. Failure to support the tool solidly with the least possible over-hang, leads to gouging, chatter marks, diamond marks, and even breakage. Wheel dressing can be held to a minimum by using the right grade of wheel on a given job.



## Cutting Action and Wheel-Life

The cutting action of the wheel is a very important factor in most roll-grinding shops as stock must be removed and a satisfactory finish must be produced in a minimum of time. Where the time element is not so important, slightly harder and longer lasting wheels can be used to advantage. Generally speaking, the cutting action with respect to rate of stock removal of a vitrified bonded wheel improves as the grit size is changed from fine to coarse and the grade from hard to soft. With resinoid and shellac wheels, however, coarser grit sizes act harder, so it is generally necessary to go softer in grade to obtain the desired results.

In some plants, the number of rolls ground per wheel or wheel-life seems to be regarded as all important, when actually the last 10 to 15% of additional wheel-life demanded can become very expensive, when it is compared to the loss in production and abuse to equipment encountered in using wheels that are too hard and require frequent dressing. Diamond dressing tools cost money and the time lost in dressing the wheel is another costly item. After all, the operator is not grinding rolls and producing while he is dressing the wheel and cutting it down and into the sump with the diamond. All things being equal, the wheel should be worn down on the roll and not with the dresser. Whenever wheel-life is looked upon as the most important consideration, somewhat harder wheels must necessarily be used than where grinding time or rate of production is the primary concern. In other words, we cannot expect 100% wheel life and 100% production at the same time. In this instance, one must arrive at a happy medium and be satisfied with what is conducive to best operations and costs. An effective incentive system makes it all important to use wheels of correct grading.

## Wheel Selection for Specific Applications

There is only one way to arrive at the best wheel for a job and that is by trial on the roll and machine in question. In roll-grinding this is somewhat simplified because the choice is narrowed down in advance to a relatively small list. We have two abrasives, namely, aluminum oxide and silicon carbide, each of which can be furnished in at least thirty-two grain sizes. For roll-grinding each of these can be had in three different bonds—resinoid, shellac, and vitrified. At least a dozen symbols are reserved for structure. Thus one can readily see that these three combinations give a wide range of wheel specifications from which to choose the right wheel for the job. Factors to be considered in selecting the wheel are:

Photos courtesy the Norton Company

1. Kind of material.
2. The amount of stock to be removed; accuracy and finish required, and rate of production desired.
3. Type and condition of the machine.
4. Size of wheel and arc of contact between the wheel and the roll.
5. Skill of the operator.

Harder grade wheels may be employed to advantage for heavy stock removal on sturdy machines which are equipped with generous size wheel spindle bearings and motors. Small diameter wheels work better on large diameter rolls due to a narrower arc of contact, allowing the abrasive particles on the wheel face to properly penetrate the hard roll surface and readily remove stock. Listed below are some National Grinding Wheel recommendations for roll-grinding.

I. **Conditioning Steel Mill Rolls**

A245—J—10BB for grinding Hot and Cold Strip Mill Backing-up rolls.
C46—I—11BB for grinding hot strip mill working rolls.
C30—I—14BB for rough-grinding spalled hot strip mill working rolls.
A80—K—11BB for grinding forged steel Cold Strip Tandem Mill Working Rolls.
A80—N—10ES for grinding forged steel Skin Mill Rolls.
C120—M—10ES for grinding nickel grain and forged steel Skin Mill Rolls.
C150—N—10ES for grinding forged steel Temper Mill rolls, for tin plate.
C320—O—10ES for polishing forged hardened steel rolls.
A60—I—10V6W for rough grinding forged hardened steel rolls.

II. **Conditioning Aluminum Mill Rolls**

A245—J—10BB for grinding Backing-up rolls.
A80—N—10ES for grinding early stand forged steel work rolls.
C1501—M—10ES for grinding back-stand work rolls or intermediate grind before polishing.
C320—O—10ES for polishing forged steel finishing rolls.
C500—O—10ES for high polish on forged steel finishing rolls.

III. **Conditioning Paper Mill Rolls**

C46—O—10ES for grinding nickel grain or nickel chill rolls.
C24—H—11BB for grinding rubber covered rolls.

## Grinding Paper Mill and Rubber Covered Rolls

A great variety of rolls may be found in a paper mill; rolls of many sizes and materials are used. They do not require the high finish of aluminum or

## Synopsis of Part 1 . . . (July, 1955)

### The Machine

- ✓ majority of machines are supplied with ammeter to determine point of highest production rate
- ✓ crowning mechanism is important, permits grinding a roll with concave or convex crown
- ✓ many roll grinding problems caused by using too-light machines
- ✓ use a 36-in. grinder for 25-in. work rather than a 28-in. grinder
- ✓ a large machine can do 25% more work with less effort

### The Wheel

- ✓ abrasive grains in wheels must be controlled in size and uniformly distributed in the wheel
- ✓ three bonds are generally used: resinoid, vitrified, shellac
- ✓ the grinding wheel is, in theory, self sharpening
- ✓ in hard materials too large a grain causes burning and glazing
- ✓ once proper wheel has been found it is best to stick with it

### Surface and Finish of Rolls

- ✓ hot strip mill rolls require a good commercial finish; for this use a 36 to 46 grain, silicon carbide, resinoid bond wheel
- ✓ for reconditioning these rolls average stock removal is from .015-in. in finishing stands to .040-in. in early stands
- ✓ hot strip back-up rolls use a 24 to 40 grain, aluminum oxide, resinoid bond wheel
- ✓ cold mill work rolls use an 80 - 150 grain, shellac or resinoid wheel
- ✓ temper mill and skin mill working rolls use an 80, 120, 150 grain, shellac bond wheel

### Fluids and Compounds

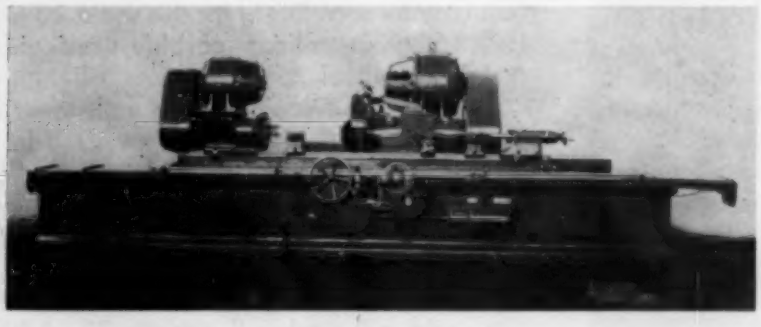
- ✓ plain water is best, but it rusts the work and machine
- ✓ we use crystal-sal-soda and have found it best
- ✓ do not use strong alkali solutions, they affect shellac and resinoid wheels

steel mill rolls, but they are very long and run at high speeds. At one end of the mill, wood pulp flows on to a wire-mesh belt where the fibers flatten out and mat to form the paper and on the other end, finished paper is slit and wound up into large rolls or coils. Between these two points, the web of paper travels hundreds of feet at speeds of 50 to 1500 feet per minute, conveyed and processed by rolls of various types; among them are chilled iron, rubber, stonite, granite, brass and copper. Most mills figure that the time lost in numerous wheel changes would more than offset what difficulties attend the grinding of all these materials with a single wheel and a general purpose compromise wheel is chosen. The chilled iron rolls are most numerous, with rubber rolls second, and the other rolls which are comparatively few, can be ground with the wheel that best suits the iron and rubber rolls. Silicon-carbide abrasive is generally favored and the organic bonds dominate the field, with shellac being favored over resinoid. Grain sizes range from 24 to 60 grit. Roll surfaces must be free from chatter marks and feed lines, and the body must be ground to very close limits and with the correct amount of crown. The problem is to select a wheel of such grain size that it will grind the chilled-iron rolls to a satisfactory finish and yet be coarse enough to grind rubber covered rolls without excessive loading. The wheel must be hard enough to hold its cut and yet be free cutting so as not to cause chatter marks. The majority of roll-grinders used for reconditioning paper mill rolls are of the two wheel type; although in a few instances conventional single wheel roll grinders are being used. The two wheel grinders have two grinding wheels from 14" to 18" in diameter, one on each side of the revolving roll, working against each other to prevent deflection of the long slender roll by wheel pressures. Shellac bond wheels are best suited for these machines. The most popular general purpose wheel specification is National C46—O—10ES, Natalon Shellac.

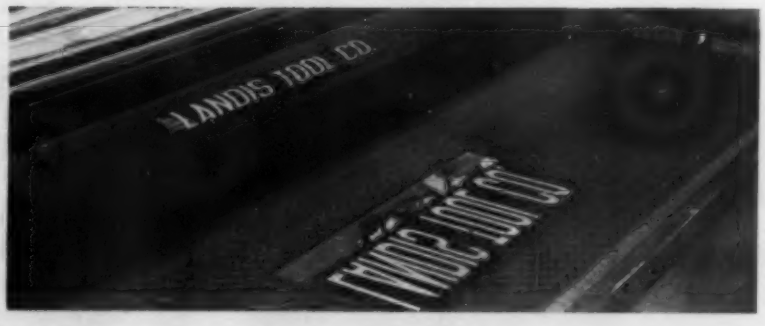
The rubber covered rolls should be ground often for economy. If the application is dry grinding, a 24 grain wheel is best if there is a free choice; and the wheel should be dressed coarse. A jet of air on the arc of contact will help prevent loading. Hard rubber can be ground at fairly high speed, while soft rubber must be ground slowly with lighter cuts. Wheel corners should be chamfered with a diamond dresser to prevent feed lines. If the work is done wet, which is favored by some, the action is somewhat smoother, with clear water as the best coolant. In this instance, as in numerous other grinding operations, conditions vary. The best solution to many grinding problems can be found by contacting an application engineer to work on the spot with the operators and department supervisors.

This material was originally presented before the Spring Conference of the A.I.S.E., Detroit, April 26, 1955.

End of the Series. ● ●



**Norton roll grinder, 16" type C. Roll grinders also available in 18-in. and 24-in. swings, ranging from 48-in. to 240-in. between centers. The model C, illustrated, is a 16 x 96-in. type C grinder with power head wheel traverse.**




**Showing the finish obtainable with modern roll grinders. This is a Landis machine.**

Available Literature

# Catalogs and Bulletins Available from Manufacturers

**For copies of the literature in which you have an interest use the postage-paid postcard. Merely circle the identifying number and mail the postcard.**

**1. Hydrabrasive Surface Grinder,** features hydraulic drive. Vibrationless operation is assured by elimination of all belts, pulleys, and running gears in the No. 1218 Hydrabrasive surface grinder manufactured by Abrasive Machine Tool Co., 36 Dunellen Road, East Providence 14, R.I. A bulletin explains why this grinder, the ultimate in machine design for surface grinding when wide cross travel (12″) and moderate table length (18″) are essential, is famous for high production and efficiency.

**2. Radial Grinders.** Designed to furnish complete and well organized information on Mummert-Dixon line of radial grinders, Bulletin No. 453 includes a specification chart listing seven portable and five suspended models. Every important detail from grinding wheel capacity to gross weight is easily located. General descriptions follow photographs of various models shown. Mummert-Dixon Co., 128 Philadelphia St., Hanover, Pa.

**3. Micro Grinder.** Critical little grinding jobs are handled with ease on the Model MG micro-grinder manufactured by Sanford Manufacturing Co., 1026 Commerce Ave., Union, N.J. Crush-form work, diamond wheels, carbide grinding, tool steels, etc. are handled on this model — 8″x12″x12″ capacity. Why this machine is a good investment for tool rooms or grinding departments is explained in Model MG Bulletin. Actual photographs of various set-ups shown.

**4. Cylindrical Grinder.** Unskilled workers can grind large quantities of components quickly, easily and within gauge tolerances on No. 270A cylindrical grinding machine manufactured by Fritz Werner, Berlin, Germany, and imported by Marac Machinery Corporation, 45 S. Broadway, Yonkers, N.Y. Designed for manual operation only, Leaflet No. 856M describes this simple, inexpensive machine by word descriptions and close-up photographs of component parts. Specifications.

**5. Tool Post Grinders.** The eccentric tube which provides for a manual belt adjustment is an exclusive feature on high speed precision Themac tool post grinders manufactured by McGonegal Manufacturing Co., Dept. GF, East Rutherford, N.J. Photographs of eight models which fit any lathe—three types of mountings—are included in a company brochure; a price list of grinders, extension spindles and standard spindle assemblies includes information pertaining to interchangeability and dimensions of spindle assemblies and extension spindles.

**6. Wiping Tip Grinder.** Continental Products, Inc., Dept. 4G, 872 E. 140th St., Cleveland 10, Ohio, distributors of Kodiak Contour-Matic wiping tip

grinder, have issued an operation and parts list manual. Complete breakdowns of all parts are included in booklet. To facilitate ordering line drawings of various parts are numbered to correspond with listing.

**7. Form Grinder.** New records for production and accuracy are claimed for Jones & Lamson Model "E" automatic form grinder. Form No. 5409-4M asks if you can use a machine that will do work **like this**—300 inner races per hour—112 valve spools per hour—36 seaming rolls per hour (all floor to floor). Production and accuracy claims substantiated and specifications given. Jones & Lamson Machine Co., Machine Tool Div., 522 Clinton St., Springfield, Vt.

**8. Abrasive Belt Unit.** "Adaptability" of the G & P 6-72 belt unit manufactured by Grinding and Polishing Machinery Corporation, Dept. GF, 2530 Winthrop Ave., Indianapolis 5, Ind., is the theme of Bulletin No. 104. A series of illustrations showing various mountings and applications clearly show the simple and ingenious uses of the unit. Your grinding and polishing problems may be solved by consulting the leaflet. Standard accessories listed.

**9. Electrolytic Grinding.** Recently electronic control of electrolytic grinding emerged from the experimental stage and now the new electrolytic shaping method for hard-to-grind materials is described in a manual published by Anocut Engineering Co., Dept. GL, 631 W. Washington St., Chicago 6, Ill. The grinding process, operation, offhand grinding and surface finishing are fully explained both in theory and practice. Anocut electrolytic grinding can reduce cost in existing grinding practice and open the way to a broader use of hard materials.

**10. Electronic Machining.** New avenues of approach to product design, building of tools, and precision production have been opened by the electrical discharge process which precision-machines the carbides and hardest metals. To bring the tremendous potentials of this machining to industry a complete research and development service is offered by engineers of Electrosize, Inc., Dept. G, 3910 Wesley Terrace, Schiller Park, Ill. Bulletin No. 549 describes the automatically controlled operation, potentials of process, and facilities at Electrosize, Inc.

**11. Honing.** The Microhoning formula: stock removal + geometry + size control + surface finish. How the Microhoning process developed and its application to modern industry is related in "Precision Production through Microhoning," the story of Micromatic Hone Corporation, Dept. G & F, 8100 Schoolcraft Ave., Detroit 38, Michigan. Job Microhoning service outlined.

**12. Honing Machine.** What is Honing? An 8-page booklet, Form X-MAN-5000F, issued by Sunnen Products Company, Dept. GF, 7938 Manchester Ave., St. Louis 17, Mo., defines the process and gives an interesting account of development from a polishing operation to one which embraces major stock removal and finishing processes. Valuable practical suggestions for use of Sunnen honing machines for production, production salvage, tool rooms, and for maintenance are included.

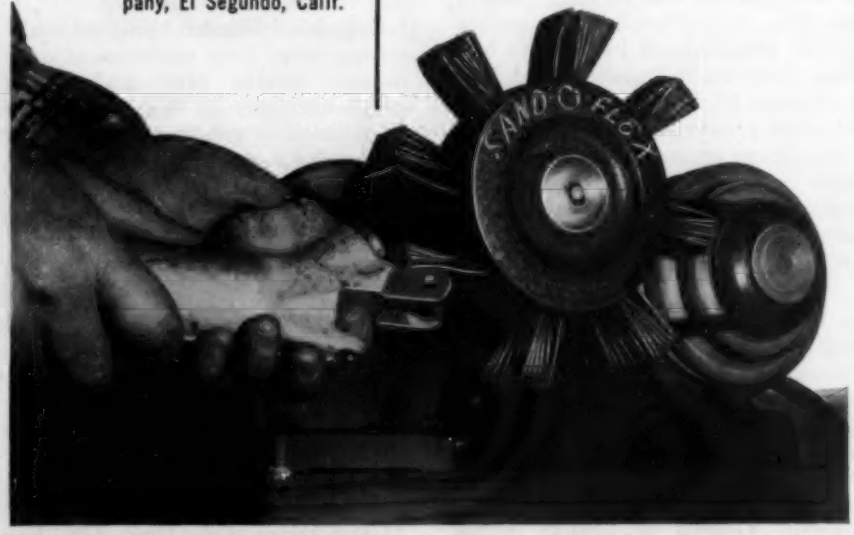
**13. Flexible Shaft Machines.** Filing, polishing, burring, sanding, grinding and wirebrushing. This unusual versatility of Kellerflex flexible shaft machines manufactured by Pratt & Whitney, Div. of Niles-Bement-Pond Co., Dept. G1, West Hartford 1, Conn., is due, in part, to the very wide variety of handpieces and attachments and the varied sizes and shapes of accessories available. A variety of models with power ratings to meet practically any job requirement are pictured in Circular No. 580.


"SAND-O-FLEX helps us do an expert low-cost deburring job."

says R. S. Wright, owner of Wright Deburring Company, El Segundo, Calif.

**"Deburring is our business,"** *states Wright, "and we have to deburr and clean up metal parts faster and cheaper than the parts manufacturers can do it themselves or we couldn't stay in business. It must pay them to ship their parts to us for deburring rather than do this job in their own plants.*

*"We use Sand-O-Flex on many different kinds of castings and machined parts. We find it does an excellent job and helps us keep our labor costs down."*




**There you have it from a man whose entire plant is devoted to *one operation only*—deburring metal parts. He uses Sand-O-Flex on all types of materials (steel, chrome, aluminum, brass, magnesium, etc.), especially on those with irregular shapes. Sand-O-Flex is attached to a bench arbor for deburring small parts and to a portable electric drill for larger pieces. Sand-O-Flex holds close tolerances when necessary, never digs into the metal or "flats" curved surfaces. Investigate Sand-O-Flex for your complex deburring problems. Write for catalog today giving prices and description of all four Sand-O-Flex models.**

**MERIT PRODUCTS, Inc.**

4023 IRVING PLACE, CULVER CITY, CALIFORNIA

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**14. Masonry Blades.** A new 4-page bulletin (A-1308) illustrated in color describes the Carborundum Company's new "Niagara" line of masonry blades. Information included in this publication covers blade types and sizes, applications, a comparative grade chart, a description of the blade identification system, and ordering information. Carborundum Co., Dept. F, Niagara Falls, N.Y.

**15. Lifting Magnets.** A new general catalog containing information on rectangular, swivelling, rotary and magnetic chucks, vacuum chucks, special types, demagnetizers, planer parallels, and the new line of Walker lifting magnets has been issued by O. S. Walker Co., Inc., 500 Rockdale St., Worcester 6, Mass.

**16. Mounted Point Wall Chart.** A handy, hang-up reference wall chart 18″x24″ showing sizes and shapes of Simonds Mounted Wheels and Mounted Points in actual size, including all items in the "A," "B" and "W" series has been issued by Simonds Abrasive Co., Dept. G, Tacony and Fraley Sts., Philadelphia 37, Pa. It also shows mandrel sizes and lists grain and grade specifications.

**17. Diamond Tools.** Surface mounted diamonds cling to tools with chemicals. The Permattach Diamond Tool Co., Inc., Dept. G & F, Milford, N.H., has announced a new line of industrial diamond tools manufactured under a process of diamond mounting originally developed by General Electric Co. and perfected by Permattach. This process actually "wets" the surface of the diamond causing a permanent chemical union between the stone and the tool shank. A complete line of wheel dressing, boring, thread grinding, radius and form dressers, shaped and lapped diamond tools are offered in a new catalog, as well as special tools made to customer specifications.

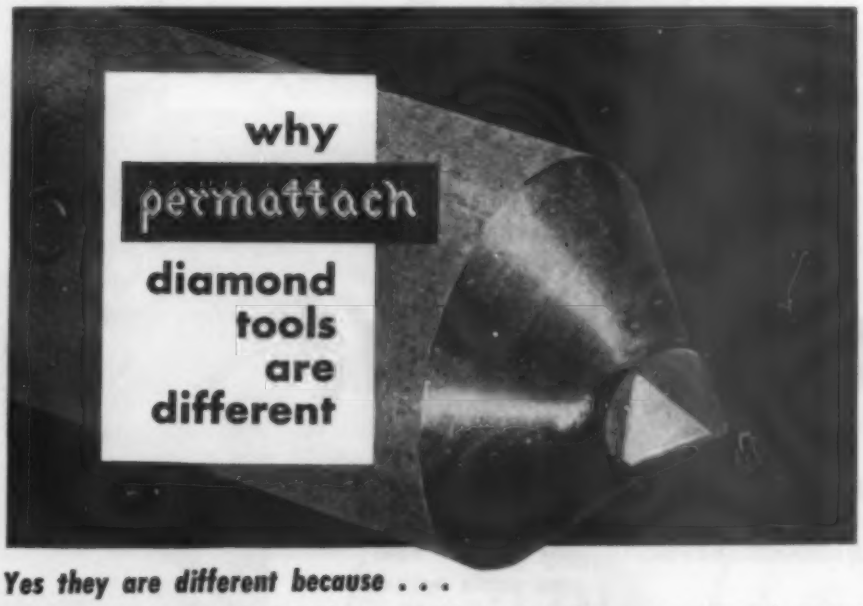
**18. Set Diamond Tools and Castings.** A selected cross-section of the complete line of Colmonoy set diamond tools for specialized grinding wheel dressing operations available from Diamonds & Tools, Inc., Dept HG, 19345 John R. St., Detroit 3, Mich., is illustrated in a new catalog DT-55. Each illustration is accompanied by a detailed description of the tool, its characteristics and typical fields of application. Castings for use as special wear-resistant machine components are also discussed.

**19. Super Cycle Tools.** More power—less weight . . . faster job . . . cooler running . . . lower maintenance . . . lower initial cost . . . lower operating cost . . . are features claimed for high production tools illustrated in Catalog 905-3. Super Cycle tools manufactured by Chicago Pneumatic Tool Co., 8 E. 44th St., N.Y. City 17 include drills, screwdrivers and nut runners, die grinders, small wheel grinders, straight and angle grinders, Duco polisher and buffers, and balancers.

**20. Tilting Sine Vises.** Surface grinding compound angles is no task with the No. 2-C Compound Sine Vise illustrated in a new bulletin released by Ideal Tool & Die Co., Inc., Dept. HG, 733 Congress Road, Schenectady 3, N.Y. Small work pieces are firmly held at any initiated angular setup. Single sine tilting sine vises are also illustrated and described.

**21. Gage Inspection.** Announcement is made by Size Control Company, Dept. B, 2500 W. Washington Blvd., Chicago 12, Ill., of a new precision gage inspection facility which complies strictly with the standards set up by the Bureau of Standards in its Metrology and Gage Divisions by its affiliate, The Midwest Gage Laboratory. A booklet describing the purpose, equipment used, and procedures for using the facilities of the laboratory is available upon request.

**22. Wheel Dressing Tools.** Properly set elongated diamonds present a nar-


***Yes they are different because . . .***

**PERMATTACH DIAMOND TOOLS are manufactured under a new patented process discovered by the world's largest manufacturer of electrical goods and grinding tools. This revolutionary new method of mounting diamonds has been perfected for precision toolmaking by the Permattach Diamond Tool Co., Inc. of Milford, New Hampshire.**

**Although the name "PERMATTACH" is new to the Diamond Tool Trade, the products of this new company are backed by many years of engineering research and experience.**

**The new process used in making PERMATTACH DIAMOND TOOLS actually "wets" the surface of the diamond. This "wetting" action makes it possible to fuse the stone to the tool by a chemical union. The result is an unbreakable bond between the diamond and the tool.**

**PERMATTACH DIAMOND TOOLS enjoy a security of the setting that far surpasses the normal life expectancy of conventional diamond tools.**

**Pressure and friction cannot weaken the bond between the stone and the tool.**

**This new method of diamond fusion eliminates the need for imbedding three quarters of the diamond in the cutting tool. Diamonds of any size and special shape can be surface mounted on the tool shank so that complete utilization of the stone is practical. As long as any part of the stone remains, Permattach Diamond Tools will cut.**

**This innovation in diamond mounting increases the cutting capacity of the stone to such an extent that small Permattach Diamonds will do the work of large diamonds conventionally mounted. The efficiency and enduring quality of PERMATTACH DIAMOND TOOLS is endorsed by leading manufacturers and tool makers. No other make of diamond tool carries a guarantee against dislodgement or loosening of the diamond.**

permattach

**DIAMOND TOOL CO. INC.**

MILFORD • NEW HAMPSHIRE

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. . .the most **Outstanding Advance** in modern precision surface grinding . . .

PRECISION REID SURFACE GRINDERS

## THE NEW — ALL ELECTRIC

6" x 18" *Reid-o-matic*

## PRECISION SURFACE GRINDER

FOR BOTH PRODUCTION AND TOOL ROOM GRINDING

with
**PUSH BUTTON CONTROLS**
for:

- CROSS FEED POWER RAPID TRAVERSE
- RAPID POWER ELEVATING HEAD
- AUTOMATIC CROSS FEED CYCLING
- ADJUSTABLE AUTOMATIC TABLE TRAVEL

MODEL 618-PF

### EXCLUSIVE NEW FEATURES . . .

*Perfected for True Precision Surface Grinding*

**TABLE SPEED:** infinitely variable from 0 to 70 feet per minute

**TABLE TRAVEL REVERSAL:** new design operates table without motor reversal

**CROSS FEED:** instantaneous at either or both ends of table travel, infinitely variable from 0 to 7/32" by dial adjustment (ideal for wheel dressing)

**GRINDING HEAD:** new design with adjustable gibs — 1 H.P. Motorized Spindle

**LUBRICATION:** fully automatic throughout machine

### PLUS 2 OTHER NEW MODELS

**MODEL 618PT** — Power Driven Table
**MODEL 618HF** — Hand Feed 6" x 18" Capacity
full unitized construction

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See these new Grinders demonstrated at **BOOTH 108**

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

*Get complete details on these new rugged Precision Grinders — write today for Bulletin PF-18*

# Reid Brothers Company, Inc.

BEVERLY, MASSACHUSETTS

row contact area to the grinding wheel, this lowers friction heat, dresses the wheel better, and reduces diamond wear. Other values of elongated diamonds and P.S.M. matrix—special steel alloy which holds diamonds firmly and permanently—are discussed in a bulletin issued by Precision Diamond Tool Co., Box No. 274, Dept. Gr, Elgin, Ill. Available in single pointed tools and multiples.

**23. Tungsten Carbide Balls** for ballizing fractional-size holes are available from Industrial Tectonics, Inc., Dept. GF, 3684 Jackson Road, Ann Arbor, Mich. Available in sets and individually for sizing and finishing fractional-size holes by the ballizing process, each ball is identified as to ball size and finished-hole diameter. Advantages and applications of the ballizing process given.

**24. Tumbling Abrasive.** Borolon is a fused crystalline aluminum oxide abrasive manufactured in arc type electric furnaces by Simonds Canada Abrasive Co., Ltd., and further processed for tumbling uses as lumps or screened sizes in the crushing plant of Simonds Abrasive Co., Dept. G, Tacony and Fraley Sts., Philadelphia 37. A new bulletin (No. ESA-236) describes the use of Borolon in all types of tumbling equipment for deburring or precision finishing a wide variety of metal and non-metal parts. Typical applications listed.

**25. Precision Cleaning and Finishing.** A quarterly brochure devoted to the subject of precision cleaning and finishing is offered by American Wheelabrator & Equipment Corporation, 1172 S. Byrkit St., Mishawaka, Indiana. A request to be placed on the mailing list will assure you of material dealing with the wet abrasive blast cleaning process—the scope of the process and the diversity of applications contained in the first issue.

**26. Blast Cleaning.** Designed to show significant applications for which Pangborn factory-assembled standard cleaning units have been purchased in the past, this booklet released by Pangborn Corporation, Dept. Gdg., 590 Pangborn Blvd., Hagerstown, Md., may suggest an idea to you for reducing the cost of some operation. Dust control suggestions also given. Standard units for both processes shown.

**27. Bulk Type Filters.** A new line of bulk type filters is illustrated in Bulletin 301 issued by Filtration Division, Houdaille-Hershey of Indiana, Inc., 26 South Ave., Lebanon, Indiana. Used in applications where oil must be kept absolutely clean, the bulletin shows illustrations of various models and covers specifications, typical applications, details of operation, and filter media data.

**28. Transparent Grinding Fluid.** A colorless, odorless solution, Cimcool transparent grinding fluid was developed for its excellent and economical rust control, and to permit the operator of a grinder to see the grinding wheel and work through the coolant. Various properties of the fluid are given in Publication No. PC-310 issued by Cincinnati Milling Products Div., The Cincinnati Milling Machine Co., Dept. G & F, Cincinnati 9. Publication No. PC-314 on Cimcool Bactericide lists its principal features and gives directions for use to inhibit bacterial growth from machine tool coolant reservoirs.

**29. Cutting and Grinding Fluid.** Master Chemical Corporation, Dept. GF, 13 Huron St., Toledo 1, Ohio, offers a 56-page booklet describing Trim cutting and grinding fluid and a description on machining and grinding procedures. The booklet describes proper procedures in the use of coolants to obtain longest tool life and best working conditions. Pocket-sized.

**30. Grinding Coolant Concentrate.** Two bulletins are being offered by Production Specialties, Inc., Dept. Gr., 755 Boylston St., Boston 16, Mass. Bulletin No. 36, "How to Use Rust-Lick 'B'," gives explicit directions on the


ACTUAL COST FIGURES!

WITH OLD STYLE GRINDERS
WHEEL COST PER TON
$3.36
WHEEL COST
PER 100 UNITS
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WITH STANDARD
INFINITELY VARIABLE SPEED
SNAGGING GRINDERS
WHEEL COST PER TON
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WHEEL COST PER
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We will be pleased to forward the report containing these actual cost results from a midwestern steel foundry after installing STANDARD infinitely variable speed Snagging Grinders.

The report is typical of many others in our files representing all types of foundries . . . reports that make Standard Grinders outstanding in effecting HIGHER PRODUCTION with LOWER COSTS.

Write for complete details!

Single and twin motor, to 100 hp, 18" to 30" wheels.

FOUNDRY GRINDER DIVISION
Since 1912
the STANDARD electrical tool co.
SNAGGING GRINDERS AND MACHINE TOOLS
2478 RIVER ROAD • CINCINNATI 4, • OHIO

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use of the coolant. Bulletin No. 37 on Rust-Lick "99X" analyzes the properties of this grinding coolant concentrate and gives directions for its use. Price list included.

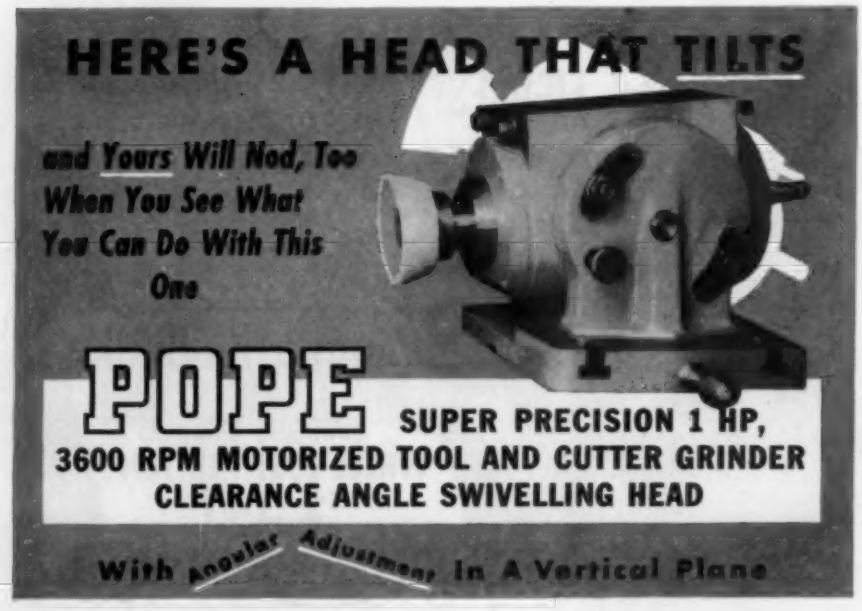
**31. Coolant Filters.** Delpark coolant filters for grinders—Besly, Thompson, and Norton—are described in three separate bulletins, one for each manufacturer. Each bulletin illustrates Delpark filter installations on the various machine models and describes in detail how the filter operates. Industrial Filtration Co., Dept. T-290, Lebanon, Indiana.

**32. Electro-Autosizing** is the process of automatic and precise control of size during a work cycle by making the size of the workpiece itself control or stop the process. To do this Electro-Autosizing Machine Division, Dept. Gdg., Industrial Gauge Corp., West Englewood, N.J., has developed a new, extraordinarily precise, drift-free and wear-free electronic gauge. A bulletin describing the dependability, application, and new electronic principle of the gauge is offered by the company.

**33. Barrel Finishing Equipment.** Nine different types of barrels in a variety of sizes and capacities are listed in Catalog C-1 issued by Casalbi Company, Dept. F, Jackson, Michigan. Specifications for Globe barrels—direct motor drive, Burr-Rite standard, Burr-Rite senior, belt drive, individual motor drive, horizontal for plastics—are included as well as descriptions and applications of the various models.

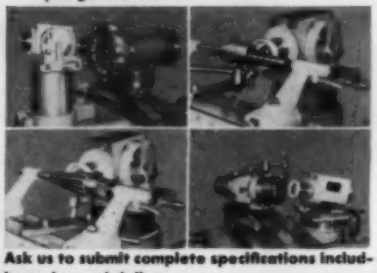
**34. "Abrasive Chips and Compounds for Barrel Finishing"** is the title of a booklet describing in detail the differences between "Honite" and "Super Honite" barrel finishing chips. Specifications for the 11 "Honite" compounds available for cutting, finishing and cleansing operations are included in the 8½" x 11" booklet issued by Minnesota Mining and Manufacturing Co., Dept. Gdg., 900 Fauquier St., St. Paul 6, Minn.

**35. "The Art of Grinding Gems and Minerals"** is a handbook for the amateur and professional lapidary prepared as a service by Lapidabrade, Inc., Gem and Mineral Division, 2153 Chestnut St., Ardmore, Pa. Included are chapters on The Primary Step in Grinding Gems, Safety, Speed Conversion Table, Trouble Shooting on Wheels, Coolant, Glazing, Wheel Wear, Wheel Specifications, and Simple Ordering Procedures.



HERE'S A HEAD THAT TILTS
and Yours Will Nod, Too When You See What You Can Do With This One
POPE
SUPER PRECISION 1 HP,
3600 RPM MOTORIZED TOOL AND CUTTER GRINDER
CLEARANCE ANGLE SWIVELLING HEAD
With Angular Adjustment In A Vertical Plane

**Give this versatile head the nod and save time and money these seven ways:**

1. You can use cup wheels for practically all clearance angles and thus produce a cutting edge on tools that lasts longer because it is stronger.
2. You can keep the tooth rest on the center line of the cutter for practically all grinding on centers or in the work head.
3. You can grind most cutters and reamers all over with a single set-up using the swivelling table and Pope tilting head.
4. You can read all clearance angles directly in degrees from the scale provided on the head. No more mistakes.
5. You can get the right clearance angle on such tough grinding jobs as slab mills, taper reamers, angular cutters and form tools.
6. You have one safe speed — 3600 RPM — for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
7. You have a head that's so easy to adjust and use it saves you time and money every time you grind a tool.



Ask us to submit complete specifications including price and delivery.

No. 101

Specify POPE PRECISION SPINDLES

POPE MACHINERY CORPORATION
Established 1920
361 RIVER STREET · HAVERHILL, MASSACHUSETTS

VISIT OUR EXHIBIT AT BOOTH 117 — MACHINE TOOL SHOW

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## Mobile Demonstrator

Royal Oak Tool & Machine Co., Royal Oak, Mich., manufacturers of the R-O Universal Form Relieving Fixture and Grinder, have equipped a station wagon with a unit which permits them to take their product to the premises of the prospect.

A demonstration on location of the grinding of a tool having radial, axial or a combination of the two types of relief is proving a big stimulant to sales.

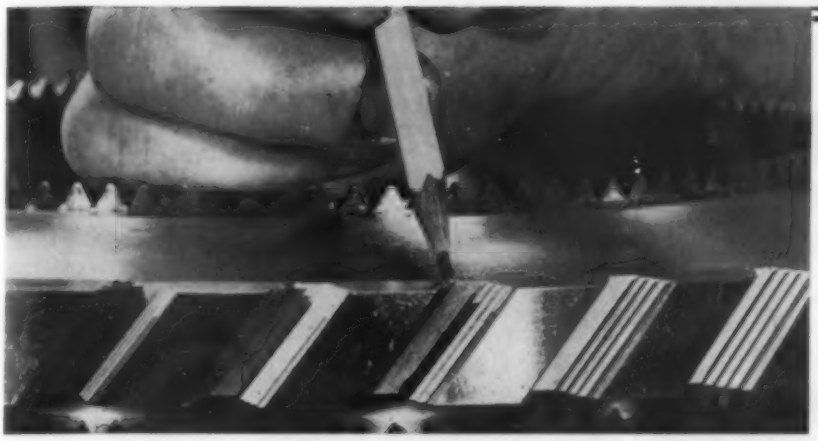
Although the fixture and grinder weigh 320 pounds, they found that the installation was practical. Rolling tracks permit sliding the R-O out over the lowered tail gate.

The station wagon demonstrator has proved so successful in one territory that it has been moved to a second area to confirm findings after which the company anticipates so equipping an entire fleet of demonstrators.

## H. Schofield Appointed Ceramics Supervisor

H. Zane Schofield has been appointed supervisor of the ceramics section in the ceramics and minerals research department at Armour Research Foundation of Illinois Institute of Technology, Chicago.

Schofield was employed by Battelle Memorial institute, Columbus, Ohio, for more than 10 years before joining the Foundation as acting supervisor earlier this year.



1. Close-up look at one of the burrs that have to be removed from the pine tree slots in the jet rotor disk. Barrel finishing grinds these burrs off and breaks the edges with complete uniformity down to rigid A. F. specifications.

# Fixture Barrel Saves $124,000 on Finishing Costs

● A 450 PERCENT increase in production and lower finishing cost per part with one fixture-type barrel is saving $124,000 annually for Le Roy Machine Co., Le Roy, N. Y. The firm is a subcontractor for compressor rotor disks, 1st, 2nd and 3rd stage, for jet aircraft engines.

Previous to the barrel's installation, the opinion was that deburring the break-edges of stainless steel compressor rotor disks could only be done by wire brush and file; yet such hand finishing was slow, tedious work and the human element of fatigue limited uniformity of finish and quality. Hand deburring averaged 18 hours per disk at a cost of $124.

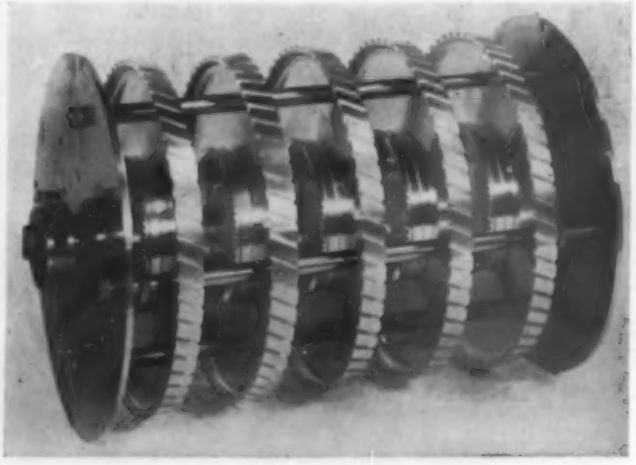
Aware of this difficult finishing job, engineers from Almco, barrel finishing equipment and supplies manufacturer, suggested to R. O. Braaten, Le Roy project engineer, that tests be conducted on sample disks in a fixture-type barrel. Previous experience had demonstrated that with this type equipment and properly designed fixtures, large, heavy or delicate parts could be successfully descaled, deburred and burnished as well as obtain close tolerance radii and low micro inch surfaces.

In this case, a suitable clamp-type fixture to hold seven disks was developed; disks were supported at three points on the ID. Clamps had to be designed so that none of the disks' surfaces were masked from the sliding mass of abrasive media and compound solution which performs the deburring and polishing. Thus, disks were held stationary and at the proper angle so that finishing could be accomplished at the fastest possible rate.

To obtain the required finish, ⅛ in. steel diagonals, aluminum oxide chips and abrasive compound were used to take greatest advantage of the barrel's sliding action in deburring difficult corner breaks and recesses and to apply the proper micro inch surfaces.

A series of tests on the sample disks demonstrated

2. Compressor rotor disks with slots are mounted for fixture barrel finishing by arbors which bolt to end plates. Large parts have to be mounted stationary to prevent impingement and peening action.

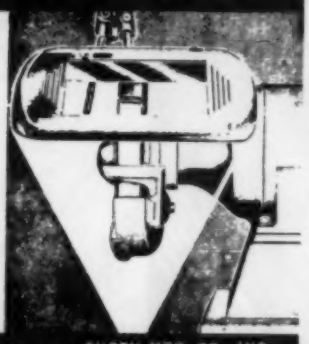


More OUTPUT with SAFETY

SUPER
VISION SHIELDS

Rugged construction with dual built-in illumination.

Shield may be adjusted to any position with two universal joints and supporting brackets. Available in four sizes for both single and double wheels where wheel centers do not exceed 11". Write for prices and complete details.



The SURTY MFG. CO.

SURTY MFG. CO., INC.
4139 W. Kinzie St.
Chicago 24, Illinois

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AER-O-MATIC . . .

A PRECISION WHEEL DRESSER
that sets new high standards
of performance

With many
added features
including

More
cutter discs
Longer cutter teeth
A larger outer diameter
The results are in better
grinding with fewer dressings

AER-O-MATIC TOOL COMPANY

5059 W. DIVERSEY CHICAGO 39, ILL.

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RUST-LICK

grinding coolant concentrate

FOR GRINDING FERROUS METALS

The use of aqueous amine nitrite solutions as grinding coolants, with or without wetting agents, are becoming more and more widely accepted as a replacement for soluble oils.

*Here are a few advantages:*

1. FREER WHEEL-CUTTING ACTION.
2. COMPLETE VISIBILITY THROUGH CLEAR SOLUTIONS.
3. COOLER ACTION—LESS DISTORTION.
4. PERMITS THE USE OF HARDER AND FINER WHEELS.
5. ELIMINATES RANCIDITY, DERMATITIS AND FOAM.
6. PREVENTS RUST AND STAINING OF FERROUS METALS.
7. LOWERS COST OF SOLUTION—INITIALLY AND THROUGH LESS FREQUENT CHANGES.

*write for free sample and brochure No. 35 to:*

PRODUCTION SPECIALTIES, INC.

755 BOYLSTON ST. BOSTON 16, MASS.

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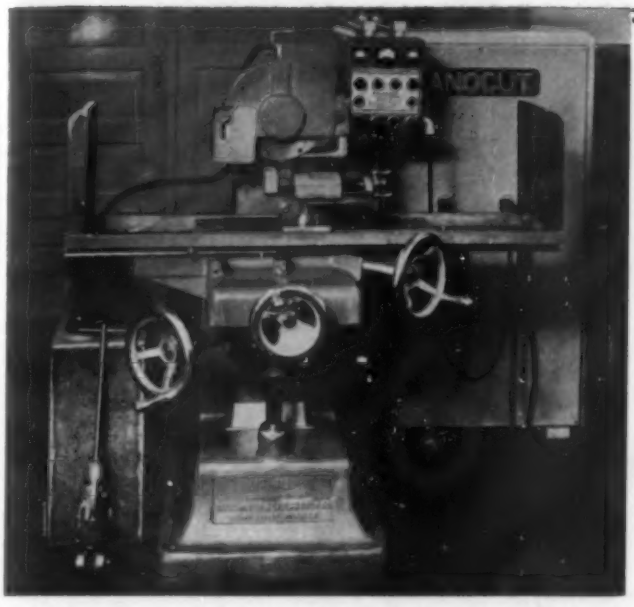
that a 24-hour time cycle was necessary to remove the burrs and to obtain the absolutely uniform radii required by rigid Air Force specifications. The tests also helped to eliminate some of the skepticism that had been expressed about precision finishing with barrel equipment.

Last year Le Roy installed a 30 in. x 32 in. fixture barrel. The entire top and front of this unit are open so that fixtured disks can be hoisted in by overhead crane, minimizing handling time. A quick-opening cover is then put in place and the 24-hour time cycle is begun. When completed, the barrel is rinsed; media removed from barrel; the fixture disks are raised out; another fixture is mounted; it is then recharged with diagonals, chips, abrasive compound and water, and another run is started.

With this method, Le Roy has increased production 450 percent, actually returning the cost of the machine weekly. Where only 241 disks could be completed per year by hand operation on a 16-hour basis, now 1040 disks are being finished at a cost saving of over $124,000. But probably even more important is the precise control over finishing variables that has established a uniformity of finish not otherwise possible.

The equipment was made by Almco Supersheen, Albert Lea, Minn. ● ●

**3. Chain hoist is used to remove cover of barrel so that fixture can be easily raised and lowered into position. Drain door is below so that abrasive media and solutions are easily emptied from drum.**




1. Electronic control for electrolytic grinding as installed with a Gallmeyer & Livingston surface grinder.

● ELECTRONIC control has made it possible to achieve surface finishes at production speeds with electrolytic grinding which have heretofore been obtainable in conventional practice only by special care and usually by adding special finishing operations.

# Electrolytic Grinding Achieves High Surface Finish at Production Speeds

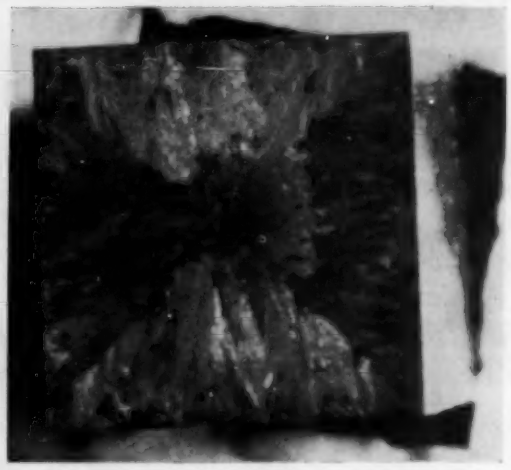
● Anocut Engineering Company, Chicago manufacturer of newly developed electronic controls, electrolytes and associated equipment, reports that in surface finishing, shop production tests at production speeds yield finishes as low as 4 micro inches rms; furthermore, while variations in surface finishes will depend on the type of material being ground, they are not related to the cutting speed as is the case with so many conventional metal working processes. The electrolytic action delivers just as good a finish with a fast cutting rate as with a slower rate. This eliminates the need of a roughing cut, followed by a finishing cut.

There have been previous reports during the development period of electrolytic grinding. All have shown dramatic savings in grinding-wheel cost, particularly with diamond wheels where savings of from 75 to 95 per cent of diamond cost have been recorded. But variations in results, both as to cutting speed and as to finishes, were characteristic of the original, experimental test studies reported. The development of electronic controls has made it possible always to obtain maximum results without variation due to operator's technique or other uncontrolled factors. The electrical equipment for such operation has only recently been made available for general industrial use.

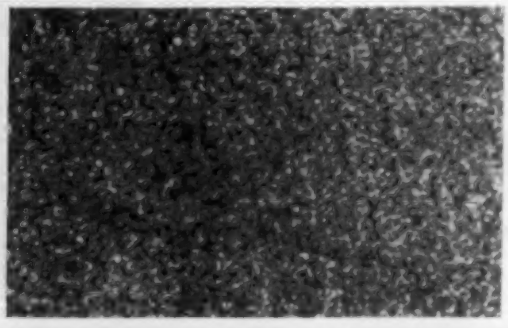
## Fundamentals of Electrolytic Grinding

Briefly, the electrical unit which is connected to any good-quality, conventional grinder provides a carefully controlled current flowing between the grinding wheel and the workpiece through an electrolytic fluid substituted for the conventional coolant. Figure 1 shows the electrical unit connected to a Gallmeyer & Livingston surface grinder as installed at Pratt & Whitney Aircraft. The electronic control element serves two purposes: first, it controls the general voltage level at the desired point regardless of load imposed by the area of work being ground; second, it responds automatically to sparking through the electrolyte to cut the voltage to prevent arcing or excessive electro-discharge which produces pit marks on the work. In this way, material removal can go forward at maximum cutting speed while at the same time a perfect etched finish is assured.

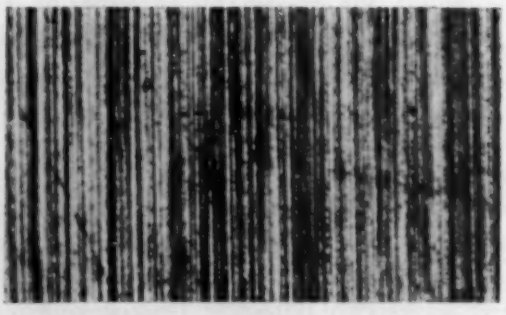
Electronically controlled surface grinding eliminates many special inspection procedures because it produces a beautifully "etched" surface that immediately reveals cracks or checks. The surface has a matte finish and is entirely free from glazing and from heat effects because essentially it is a "cold" process. For instance, Type 831 tungsten carbide



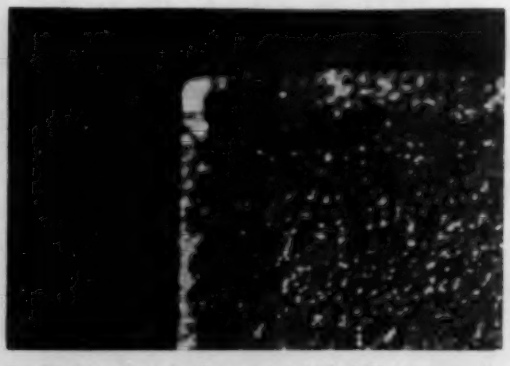
**2. Enlarged photograph of the end of a 5/16-in. square tool bit of stellite showing "etching" effect of electrolytic grinding.**



**3. Micro photograph showing surface of tungsten carbide ground with electronic controlled electrolytic grinding. Profilometer reading: approximately 5 micro inches rms.**



**4. Conventional ground tungsten carbide specimen finished to profilometer reading of 4 micro inches rms shows marked grinding scratches.**



**5. Profile of tool edge magnified: 1/16-in. equals .001-in. Edge radius is approximately .001-in.**

can be ground rapidly with no precautions to avoid heat checks, cracks and crumbling.

The etching effect of this electrolytic grinding process is illustrated in Figure 2 which is an enlargement of the end of a 5/16" square tool bit of stellite ("Star-J" grade). The crystalline structure as well as the small "pipe" at the center is clearly apparent. By conventional grinding the same material shows a bright, reflective surface with characteristic grinding marks or scratches. For many applications the freedom from surface stressing, the elimination of "smear" found in ordinary grinding, and the exposure of the parent material will have obvious advantages.

## Surface Finish Obtained

Figure 3 shows the surface of tungsten carbide (type 831) ground with electronically controlled electrolytic grinding. Profilometer reading for this specimen was approximately 5 micro inches rms. The surface is almost entirely free of any grinding marks. For comparison purposes, another tungsten carbide specimen was carefully finished to a profilometer reading of about 4 micro inches rms, a value deliberately selected below that of the electrolytically ground specimen. This is shown in Figure 4. Both illustrations are taken to the same magnification. The elimination of marked grinding scratches prevents microscopic "saw toothing" and localized stresses, which are thought to initiate checking and breakdown of the material under bearing pressure or as use in cutting tools.

The process has been used for high speed steels, stellite, tantung, chromium titanium alloys — all tough materials to grind—and also for shaping aluminum and steel honeycomb material, which is difficult to shape by conventional methods because of its fragility.

The edges of ground materials can be held as sharp as in conventional process. Figure 5 shows a profile of an edge magnified so that 1/16 in. on the illustration is equal to .001 in. in the sample. The edge radius in this case was approximately .001 in. It has been found, however, that in many applications, particularly for heavy-cutting tools, a deliberately rounded edge will yield greater tool life. This can be accomplished in the electrolytic process by relocating the electrolyte nozzle to provide an intended pile-up of electrolyte on the cutting edge of the tool. By this means, the seperate operation of hand honing to remove any feather edge or burr or to produce intended rounding is eliminated.

With the electronic control system, any operator can apply electrolytic grinding to any conventional grinding technique with little deviation from ordinary practice. No long instruction period is necessary. The operator of ordinary skill can then produce finishes of an order previously entrusted only to specialists. ● ●

# LOW COST UNIVERSAL GRINDERS

## 12″ x 3″ OD - ID Grinder

Hydraulic Plunge Cut or Mechanical Plunge Cut units—completely universal with swiveling wheelhead, workhead and table. 12x1½x3 OD wheel with 2 H.P. Motor. Roller bearing wheel head slide. Ultra precision plain bearings in wheelhead and workhead. Dumore interchangeable quill spindle in swinging internal head. Hydraulic table feeds of 0-312″ per minute—workhead speeds 125-610 RPM. Minimum infeed .0001″. Dead and live centers with quick collet attachment for Hardinge 4 C collets. Built in template or form dressing of wheel plus radius dressing attachment.

**Plunge Cut Hydraulic Model** ..... **$4900.00**

**Plunge Cut Mechanical Model** ..... **$3850.00**

## Universal Tool Grinder

8″x12″ WET completely universal radius and spiral fluting from the solid tool grinding and tool lapping machine. 7″ wheel capacity. Instant setup for grinding left or right hand spirals from the solid up to 45° angle. Quickly changeable grinding and lapping speeds utilizing either oil or soluble oil coolant. Quick change collet fixture for 4C Hardinge collets and motorized head for radius and angle grinding. The only machine of its type in the world today capable of wet grinding all forms of carbide or high speed steel from the solid or with a finger.

**Price** ..... **$1850.00**

★ ★

**ON DISPLAY AT BOOTH 444**

**COLISEUM MACHINERY SHOW — SEPT. 6-17th**

## THE AMERICAN HERFORDER CORP.

**1801 W. COLUMBIA AVE.**
**CHICAGO, ILL. — HO 5-8922**

**HERFORD,**
**GERMANY**

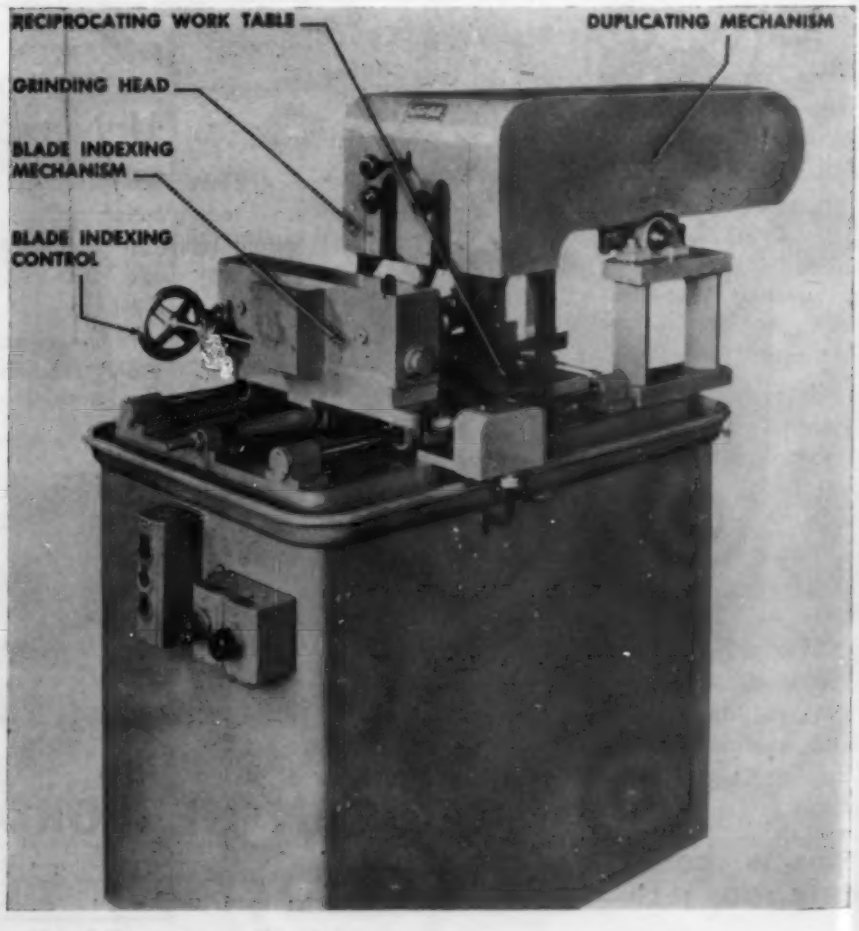
Encircle No. 251 on card, opposite Page 72

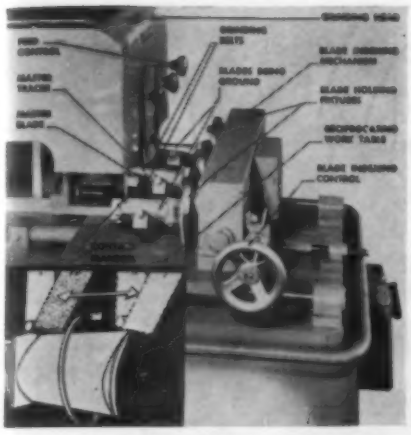
What's New in Equipment and Materials

## Automatic Edge Grinder Contour Sizes, Finishes Lead Edge

The versatile Kodiak Contourmatic duplicating edge grinder is a self-contained hydraulically operated unit that provides fine finish and simplifies holding tolerances within aircraft standards. Operation of grinder can be completely automatic or semi-automatic with hand indexing. Master contour pattern is duplicated on 1 to 1 ratio by specially developed abrasive belts that can be run wet or dry. Curves or straight edges of any type are ground to close tolerances, the manufacturer claims.

In sizing and finishing the leading





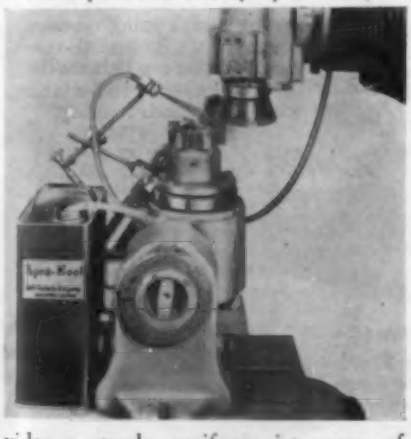
and trailing edges of buckets and blades for jet engines, two buckets or blades to be sized and finished are mounted on either side of a master contour pattern. Mandrel in contact with master guides an abrasive belt at edge of each bucket. Fixtures are set to rotate predetermined number of degrees between strokes to generate radius. Finishing is performed parallel to axis of blade, eliminating grinding marks across axis of blade which create undesirable high stress concentration points. One edge of five inch blade can be finished in approximately 30 seconds. The grinder is distributed by Continental Products Inc., 3331 Superior Ave., Dept. GF, Cleveland 14, Ohio.

Use HANDY Card, opposite page 72. Encircle No. 101

## Spray Coolant System Eliminates Dry Grinding

The Spra-Kool system for applying spray coolant to any type of dry grinding or polishing operation, as well as certain drilling, milling, chamfering, or boring operations that do not require flood coolant, has been announced by Bar Products Co., 3703 Highcrest Rd., Rockford, Ill.

A simple valve and spray nozzle pro-




vides a steady, uniform jet spray of coolant to tools and work. The fine spray prevents dust and dissipates heat from work, allowing continuous grinding without burning, heating, or warping. Combined advantages are rapid evaporation and forced air jet penetration at the point of work-wheel contact.

By eliminating dry grinding, the new system is claimed to provide longer wheel life, reducing the tendency of soft wheels to break down and hard wheels to lead. It prevents damaging work from excessive heat, makes possible better finishes and increased output, the manufacturer reports. A rust inhibitor mixed with the coolant also prevents tarnish and rust stains.

The mechanism is designed for quick setups and easy use. A length of hose is attached to any air line; the nozzle is then positioned to the work, and the spray control is adjusted to provide maximum cooling results. There are no pumps, settling tanks, or complicated filters. No splash guards or drain pipes are needed since any excess spray evaporates quickly.

The amount of coolant applied is varied either by adjusting the air pressure or raising or lowering the siphon level of the coolant. Operation is unaffected by sudden or varied drops in air pressure.

The complete unit includes a 1-⅞" capacity adjustable clamp, full universal knuckle, air control valve, spray nozzle, four feet of air hose, three feet of rubber tubing, and a gallon container.

Use HANDY Card, opposite page 72. Encircle No. 103

## Unusual Machining Process Shown in Color Films

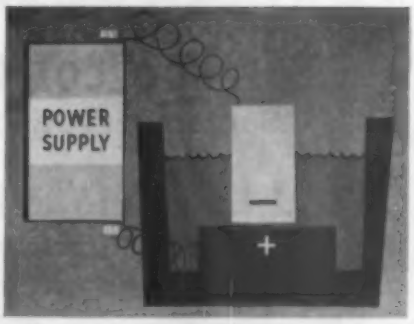
Video Films, Detroit, has completed a film for the Elox Corp. to explain the theory, application and benefits of electrical discharge machining, said to be a revolutionary concept in the field of metalworking. Metal can be cut by a tool softer than the product. Shapes are cut into the hardest metals, including tungsten carbide.

The tool never actually touches the work. Neither the work nor the tool are heated in the process and the machine uses no more electricity than a bread toaster. The actual cutting takes place down in a pan of liquid coolant and cannot be seen.

In this color film, electrons, atoms, charged vapors and other phenomena are illustrated by an art style that differs greatly from standard mechanical animation sequences. To show actual cuts in progress, the company's engineers set up jobs so that they could be disassembled to give the camera a cross-sectional view. A portion of the cut was made under normal conditions, then the coolant was drained from the tank, the two-section workpiece split and an exposure made. The tank was refilled, another portion of the cut made and then draining and disassembling repeated. Although it took almost eight hours to shoot, the process of cutting a ½" round hole through ½" of tungsten carbide, which ordinarily takes 15 minutes, is shown on the screen in about 45 seconds. A bottomed cavity cut and a grinding operation are shown by the same technique.

Near the end of the picture, which runs under 20 minutes, examples of jobs done by Elox electrical discharge machining are shown in full screen close-ups. The pictures show clearly the excellent finish the process produces.

The scenes are accompanied by a narration that, while technically accurate, can be easily understood by the layman. Showings of the film to interested groups can be arranged by contacting the Elox Corp., 740 N. Rochester Rd., Clawson, Mich.




**Opening scene shows workpiece (at bottom of tank) and tool immersed in coolant.**

**Electrode cutting hole in tungsten carbide was filmed through the time lapse technique. Cross-sectional view shows end of cut, after core has dropped out of workpiece.**

**For the underwater sequence a glass tank was used to show electrode eating through carbide steel block. Black material is not smoke, it is fine particles of workpiece that have been removed.**

Use HANDY Card, opposite page 72. Encircle No. 102

*We'll Be There!*

**Plan to visit Booth No. 656**

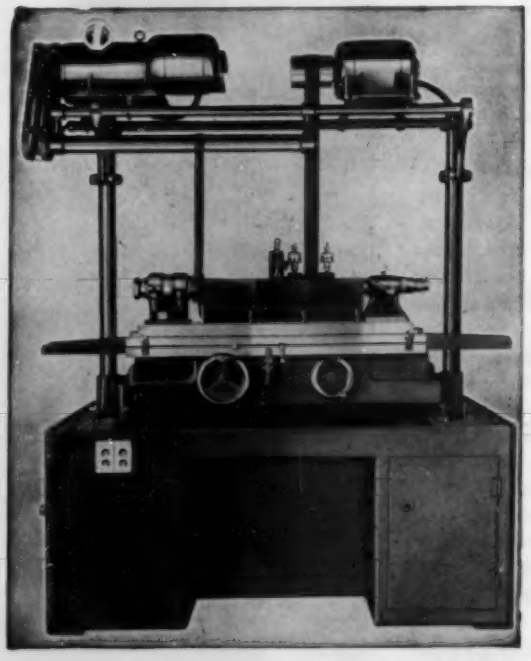
**CHICAGO COLISEUM**

**September 6th-17th**

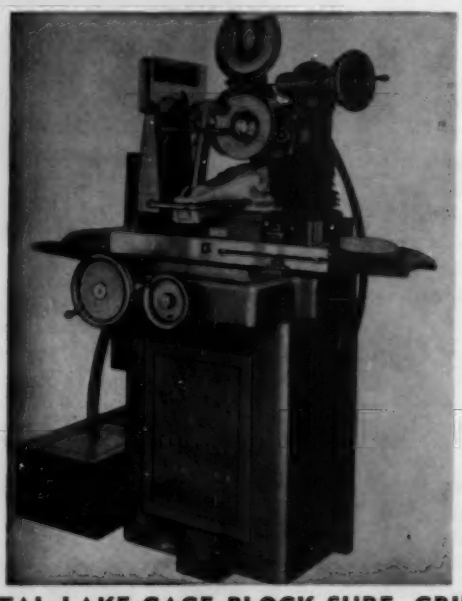
**See:**

**CRYSTAL LAKE 8x16 UNIV. GRINDER**

**grinds in the .000010 accuracy range**



**CRYSTAL LAKE No. 750 PLAIN GRINDER**
**equipped with the latest electronic drive**



**CRYSTAL LAKE GAGE BLOCK SURF. GRINDER**
**6 x 12, the Grinder that will grind so flat with a 46 grit wheel that blocks will ring together.**

**CRYSTAL LAKE GRINDERS**

*Since 1910*

**CRYSTAL LAKE, ILLINOIS**

Encircle No. 252 on card, opposite Page 72

"Exactly who is this 'wonderful gang from the shop'? She's the only one who turned up!"

**BIG $ SAVINGS FROM SMALL INVESTMENT**

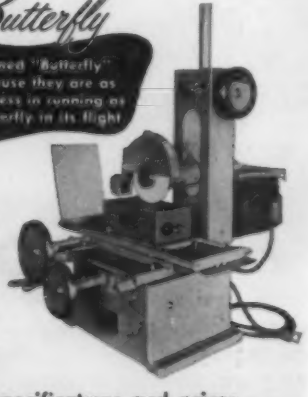
BUTTERFLY Bench-type precision machines increase tool-and-die shop efficiency, because they save hand labor, and avoid tie-up of larger floor-type machines. Many jobs can be done faster on these small machines.

**BUTTERFLY PRECISION FILING AND SAWING MACHINE**

Eliminates costly hand filing, sawing and lapping on dies, gauges, tools. So smooth-running that you can balance the flat end of a pencil on the table while machine is running.

*Butterfly*

Named "Butterfly" because they are as noiseless in running as a butterfly in its flight



**BUTTERFLY PRECISION SURFACE GRINDER**

A dual-purpose machine. Rigid and powerful enough for deep roughing cuts, sensitive enough for fine grinding to highest accuracy. Dynamically-balanced spindle supported at both ends by duplex-mounted angular-contact ball bearings.

**Write for description, specifications and prices**

HARVEY MANUFACTURING CORP.
Subsidiary of GERMANOW-SIMON MACHINE CO., Inc.

**416 St. Paul St., Rochester 3, N. Y.**

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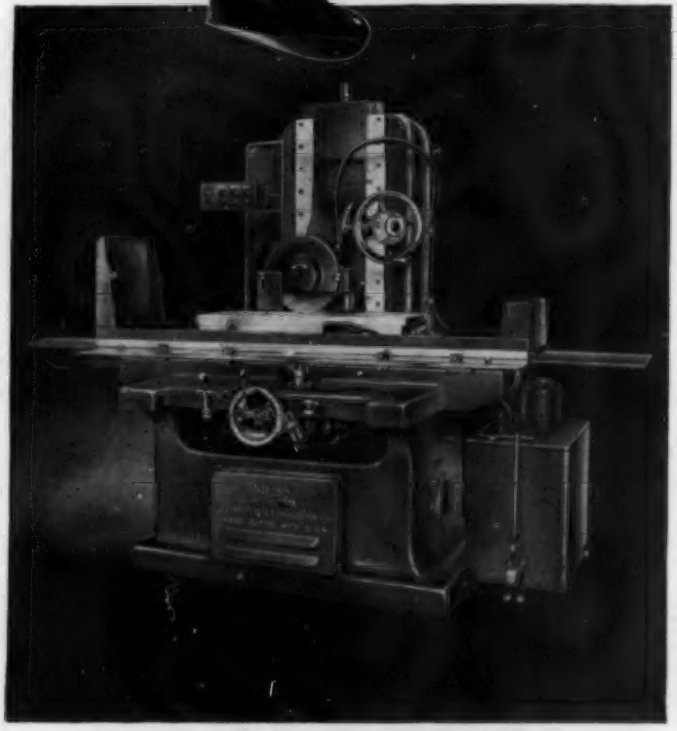
## FOUND WHERE WORLD FAMOUS AIRCRAFT ARE "BORN"

# GRAND RAPIDS GRINDERS



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REPUBLIC

Just take a look in their toolrooms! Every one of these famous aircraft manufacturers uses Grand Rapids Grinders . . . depends on them for the uncompromising precision on which records and reputations are made.

Grand Rapids Grinders are engineered and built for unusual long life of precision grinding. Our Model 55 shown here, for instance, features column and base of massive, *one-piece* casting for vibrationless rigidity and permanent alignment. Both longitudinal table travel and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. Table speed is variable up to 125 fpm . . . faster than any other of this type and size.

*That's* why so many tool room men insist on Grand Rapids Grinders.

GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER
This precision tool room type machine has table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.

*Just a note on your letterhead will bring you full details.*

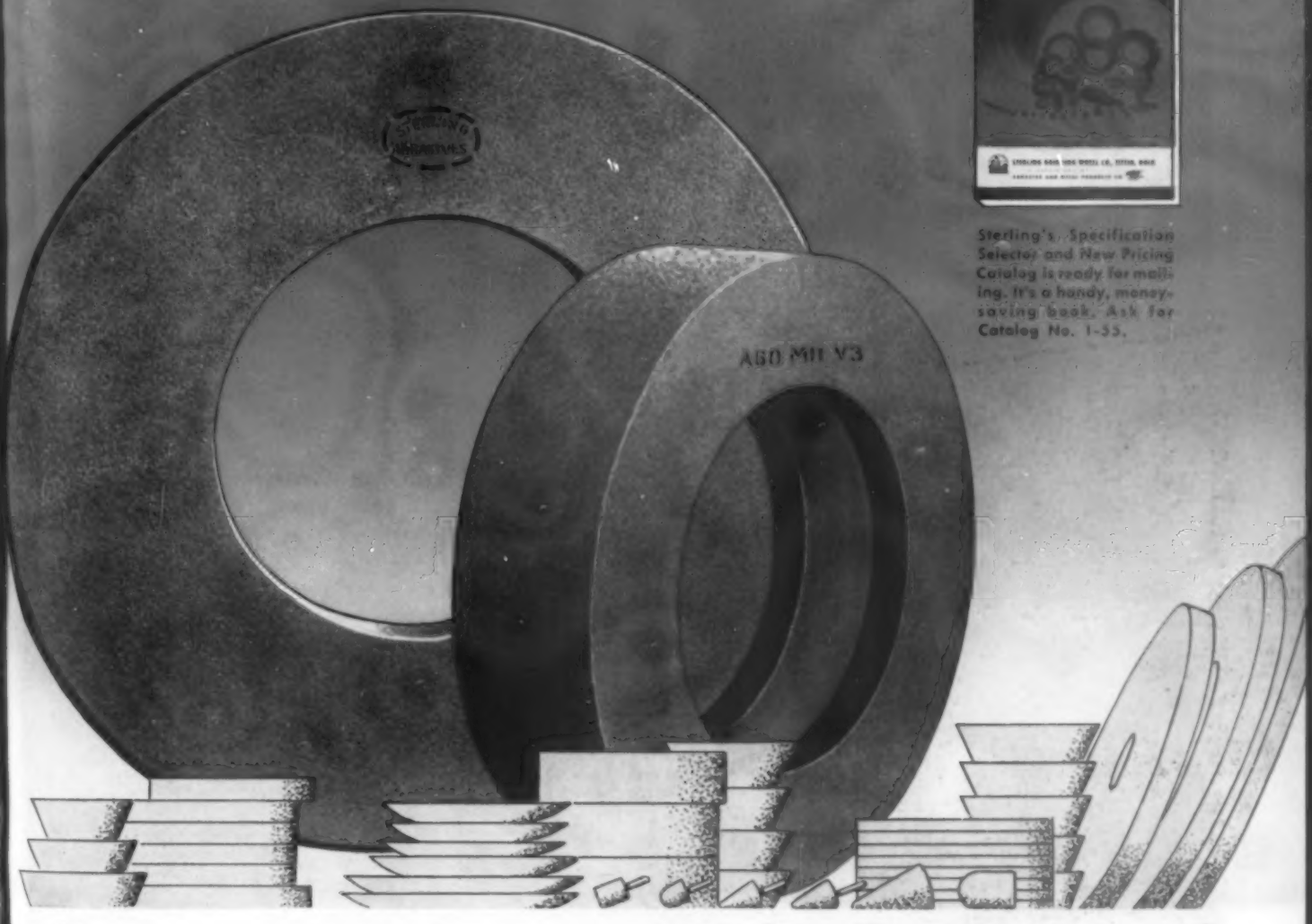
**GALLMEYER & LIVINGSTON COMPANY** 416 Straight Ave., S.W., Grand Rapids, Michigan

Encircle No. 254 on card, opposite Page 72

# WRESTLING

## WITH PRECISION GRINDING PROBLEMS? LET STERLING "WHEELS OF INDUSTRY" SOLVE THEM!

Sterling's Specification Selector and New Pricing Catalog is ready for mailing. It's a handy, money-saving book. Ask for Catalog No. 1-55.




Sterling's "Wheels of Industry" are engineered to your special needs for precision and faster production.

Although Sterling Grinding Wheels are custom-made to many specific job demands, there is no extra charge for premium performance. Their built-in quality is evident on every job.

Stop wrestling with grinding problems! At your convenience, try a Sterling test wheel on one of your more difficult jobs. Write or wire us today and an experienced abrasives engineer will call and provide a quick solution.

"THE WHEELS OF INDUSTRY" STERLING ABRASIVES

## STERLING GRINDING WHEEL CO., TIFFIN, OHIO

A SUBSIDIARY OF

**ABRASIVE AND METAL PRODUCTS CO.**

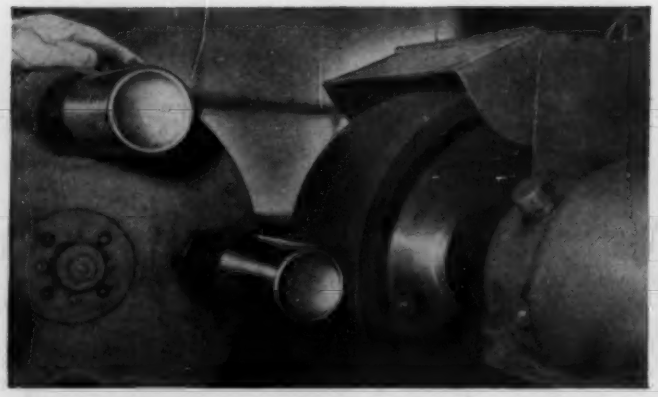
A&MP COMPANY

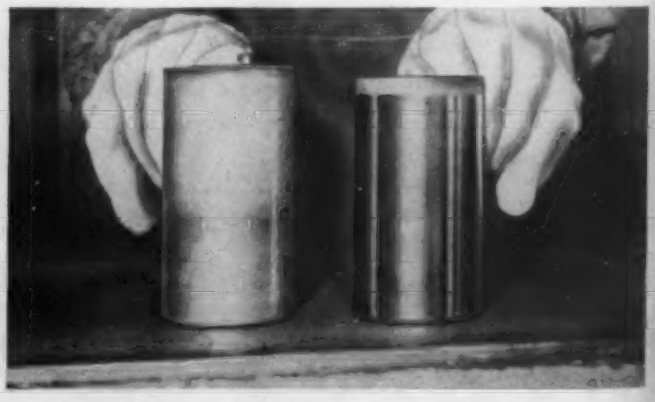
DISTRIBUTORS IN ALL PRINCIPAL CITIES

Circle No. 276 on card, opposite Page 72

# How would you solve it?

**(1) Production Problem:** To cut unit costs of grinding and polishing stainless steel whip-cream dispenser cans. Nilsen Mfg. Co. had been jobbing out the cans to an outside source, paying a high .08¢ per can, due to old-fashioned methods, labor, material and delivery costs.





**(2) Solution:** A 3M Representative recommended that this Addison, Illinois, manufacturer install the 3M Method, using Grit #180 Resin Bond Belts running over a special contact wheel. Cans were placed on automatic work holders.

**(3) Results:** An immediate reduction in polishing costs. By installing the 3M Method, and doing the work themselves, Nilsen Mfg. Co. cut costs to only $.0125 per finished unit . . . a saving of $.0675 per can! A 3M Representative can help you solve your grinding and finishing problems, too. His services are available without cost or obligation.

3M ABRASIVES

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Pressure-Sensitive Tapes, "Scotch" Sound Recording Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

**WANT MORE INFORMATION?**

**Minnesota Mining & Mfg. Co.**
**Dept. IU-85, St. Paul 6, Minn.**

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☐ *Have 3M Representative Call*

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